THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXV. No. 1660.] LONDON, MARCH 5, 1895. [47TH YEAR. PRICE 6d.

GAS AND WATER PIPES

1¼ to 12 IN. BORE.

THOMAS ALLAN & SONS,

Bon Lea Foundry,

SOUTH STOCKTON-ON-TEES.

ALSO MANUFACTURERS OF
SANITARY & RAIN-WATER PIPES, HOT WATER PIPES, STABLE FITTINGS, RANGES, STOVES, And GENERAL CASTINGS.

GLASGOW OFFICE: 24, GEORGE SQUARE.
Telegrams:
"BONLEA, STOCKTON-ON-TEES."
"SPRINGBANK, GLASGOW."

— ESTABLISHED 1830. —

PARKER & LESTER,

Manufacturers & Contractors.

THE ONLY MAKERS OF

PATENT ANTIMONY PAINT,

Parker's Imperial Black Varnish,

Oxide Paints, Oils, and General Stores for Gas and Water Works.

WORKS:
ORMSIDE STREET, OLD KENT ROAD,
LONDON.

WOLSTON'S

TORBAY PAINTS

Special Quotations to Gas Companies.

DARTMOUTH, DEVON.

Lanemark Coal Co.,

LIMITED.

LANEMARK CANNEL AND GAS COALS.

Quotations and Analysis on Application to

LANEMARK COLLIERY,

NEW CUMNOCK, N.B.

Shipping Ports: All the principal Scotch Ports.

THE NATIONAL.

Absolutely the Best Slot-Meter Obtainable.

GUARANTEED FOR 5 YEARS.

Telegraphic Address: "Stidder," London. Telephone Number, 4843.

Takes **PENNIES** and **HALFPENNIES** in the same slot, and supplies proportionate quantities of gas.

The coin-receiving mechanism is immensely strong, and so separated from the registering mechanism, that it is impossible to damage either, even with the most careless usage.

THE NATIONAL.

Will take a number of pennies, but cannot be jambed by the insertion of a second coin until the first is discharged.

Is compact and handsome; cannot be tampered with by any amount of ingenuity; whilst its mechanism is the simplest and strongest in the market.

Price changeable *in situ*.

WE INVITE YOU TO TEST THIS METER IN COMPETITION WITH OTHERS.

THE NATIONAL METER COMPANY, LIMITED.

OFFICE AND WORKS:

AQUINAS ST., STAMFORD ST., LONDON, S.E.

SAWER & PURVES, Garratt St. Works, MANCHESTER,

MANUFACTURERS OF

IMPROVED WET GAS-METERS IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

IMPROVED DRY GAS-METERS.

Speciality: PATENT CASH PREPAYMENT METERS.

CATALOGUE SENT ON APPLICATION.

PUMPS FOR GAS & WATER WORKS.

FIRST AWARDS EVERYWHERE.

TELEGRAMS: "EVANS WOLVERHAMPTON."

TRADE MARK.

APPLY FOR CATALOGUE NO. 8

(No Trappets.)

Fig. 600. "CORNISH" STEAM-PUMP FOR WATER.

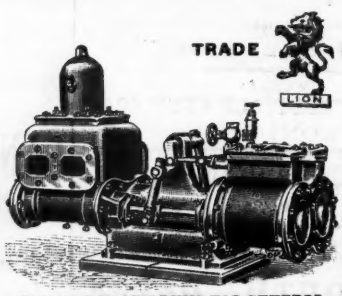


Fig. 670. DUPLEX PUMP FOR GENERAL PURPOSES.

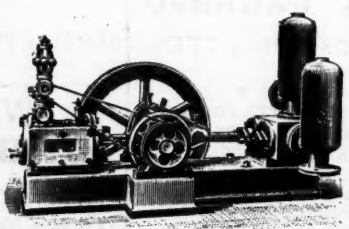


Fig. 683. "RELIABLE" PUMP FOR TAR AND THICK FLUIDS.

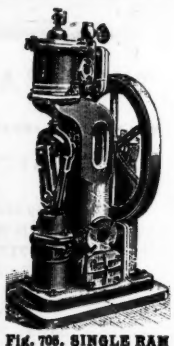


Fig. 706. SINGLE RAM PUMP FOR BOILER FEEDING, &c.

JOSEPH EVANS & SONS, Hydraulic Engineers,

WOLVERHAMPTON. LONDON OFFICE: 16, Union Court, Old Broad Street, E.C.

THE

Imperator Argand Burner.

The most powerful Argand Burner, giving a brilliant, white, tulip-shaped Flame, and a perfectly silent Light, having an excellent Regulator

Light equal to 38 Sperm Candles.

FOR VARIOUS PATTERNS OF SHADES AND GLOBES TO SUIT THIS BURNER,

SEE OUR ILLUSTRATED CATALOGUE.

Every kind of Argand and Flat-Flame Steatite Burner in the Market manufactured by

FALK, STADELMANN, & CO., LD.,

VERITAS LAMP WORKS,

FARRINGDON ROAD, LONDON, E.C.

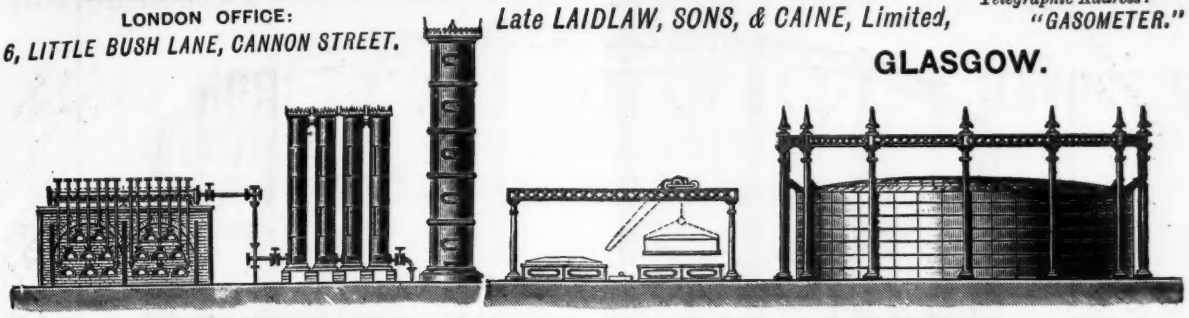
FACTORY AT NUREMBERG, GERMANY.

THE BARROWFIELD IRON-WORKS, LIMITED,

LONDON OFFICE:
6, LITTLE BUSH LANE, CANNON STREET.

Late LAIDLAW, SONS, & CAINE, Limited,
GLASGOW.

Telegraphic Address:
"GASOMETER."



MANUFACTURERS OF ALL KINDS OF GAS PLANT.

RETORT-BENCH FITTINGS; SIEMENS'S REGENERATIVE AND ORDINARY FURNACES
CONDENSERS, EXHAUSTERS, AND ENGINES; SCRUBBERS, WASHERS;
PURIFIERS, WITH PLANED AND CEMENT JOINTS;
DRY AND HYDRAULIC CENTRE-VALVES;
HYDRAULIC AND HAND-POWER LIFTING APPARATUS;
GASHOLDERS, SINGLE-LIFT & TELESCOPE; CAST & WROUGHT IRON TANKS;
STATION METERS; GOVERNORS; SCREW AND RACK VALVES;
FOUR-WAY COCKS AND HYDRAULIC VALVES;
CAST-IRON GAS, WATER, & STEAM PIPES & CONNECTIONS; WROUGHT-IRON TUBES & FITTINGS;
IRON ROOFING, MARKET BUILDINGS, BRIDGES, GIRDERS, STEAM BOILERS;
PROMENADE PIERS AND LOADING WHARVES.

MANUFACTURERS OF OIL PLANT OF EVERY DESCRIPTION.

HENDERSON'S Patent Retorts, Condensers, Stills, Cast and Wrought Iron Tanks, Ammonia Stills, Wrought-Iron Gas-Mains, &c., &c.

DESCRIPTIVE SPECIFICATIONS AND ESTIMATES ON APPLICATION.

W. H. ALLEN & CO.,

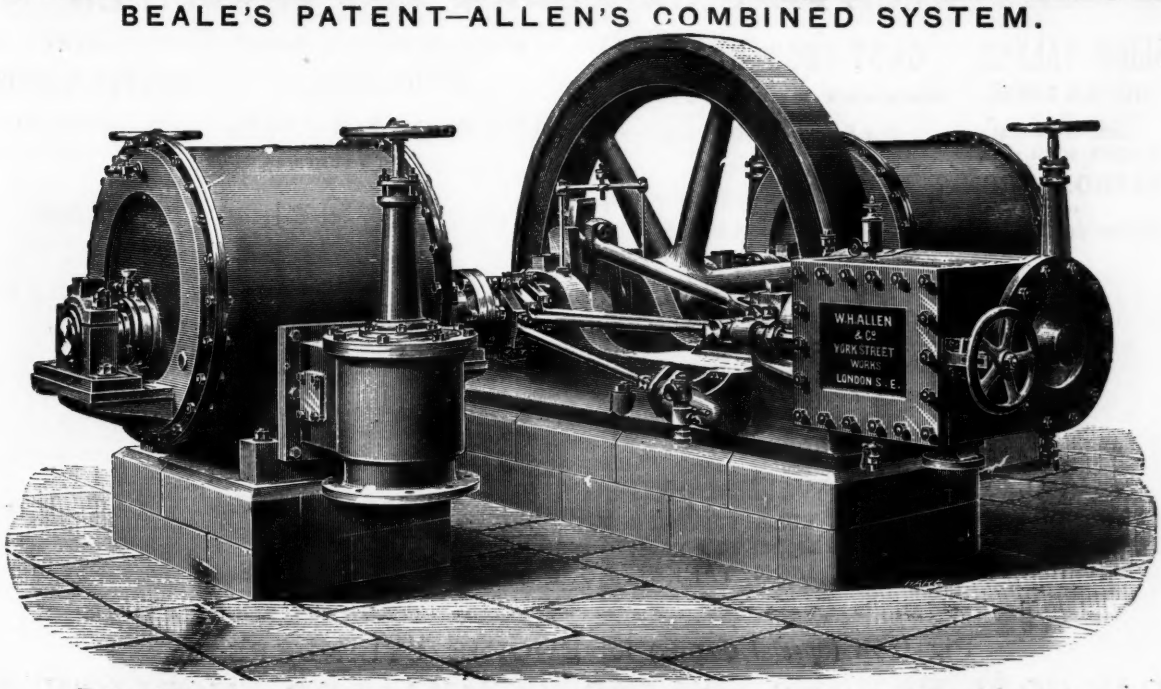
YORK STREET WORKS, LAMBETH, LONDON, S.E.,

And of QUEEN'S ENGINEERING WORKS, BEDFORD,

MAKERS OF THE MOST IMPROVED FORM OF

GAS EXHAUSTING MACHINERY

BEALE'S PATENT—ALLEN'S COMBINED SYSTEM.

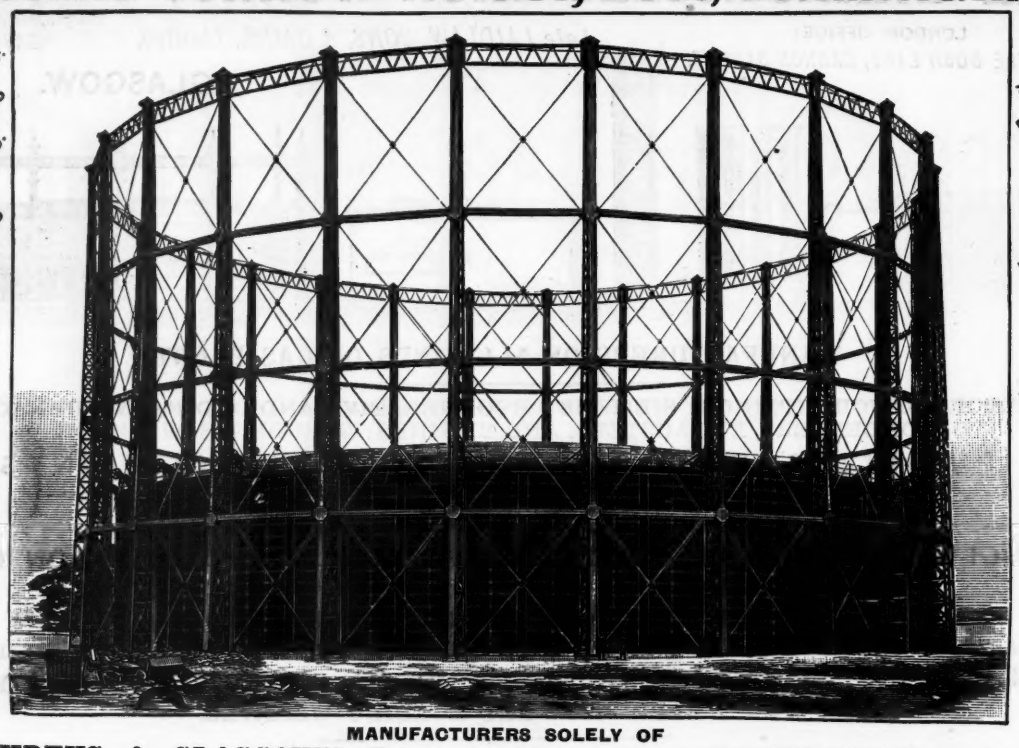


Pair of Non-Oscillating Exhausters, passing 200,000 Cubic Feet of Gas per Hour.

THOMAS PIGGOTT & CO., LTD., BIRMINGHAM.

LONDON OFFICE: ST. THOMAS APOSTLE, E.C.

GAS PLANTS, BOILERS, ENGINES, PUMPS, ROOFS, RETORT-FITTINGS, ETC.



TELEGRAPHIC ADDRESS: ATLAS BIRMINGHAM

WELDED & RIVETED PIPES, FOUL MAINS, RETORT-LIDS, WROT & CAST TANKS, PURIFIERS.

MANUFACTURERS SOLELY OF

HUMPHREYS & GLASGOW'S PATENT CARBURETTED WATER-GAS PLANT.

HAS ALREADY BEEN SUPPLIED TO GAS-WORKS AT

COPENHAGEN, BRUSSELS, GLASGOW, BELFAST, LIVERPOOL, TOTTENHAM, and is in course of Erection now at BELFAST (Second Contract), SWANSEA, & BRIGHTON.

Inquiries to be sent to the Patentees: 9, VICTORIA STREET, LONDON, S.W.

GAS COAL.

BEST

REAL OLD SILKSTONE GAS COAL,

Address THE STRAFFORD COLLIERIES COMPANY,

Near BARNSLEY, SOUTH YORKSHIRE.

NEWTON, CHAMBERS, & CO., LIMITED

THORNCLIFFE IRON-WORKS, near SHEFFIELD,

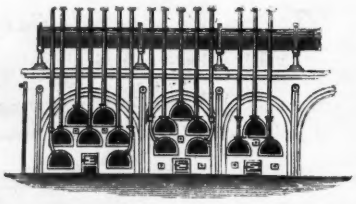
MANUFACTURERS OF

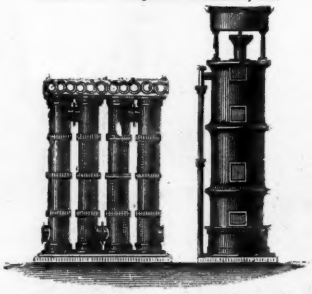
SLIDE VALVES,
WITH RACK & PINION
OR
Internal or External SCREWS of all sizes.
GASHOLDERS,
AND
Gasholder Tanks.

CAST-IRON RETORTS,
RETORT-BED FITTINGS,
And Retort-House Appliances
of every description,
Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

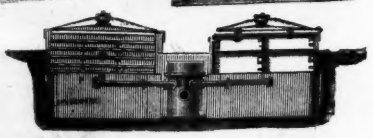
WROUGHT AND CAST IRON
CONDENSERS, SCRUBBERS, & WASHERS,
TAR AND LIQUOR PUMPS, &c.

PATENT
CENTRE-VALVES
for working Purifiers,
Also Bye-Pass & Stop Valves.





PURIFIERS with Planed Joints,
HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS.
WOOD GRIDS.
CAST AND WROUGHT IRON TANKS AND CISTERNS.



DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.

Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

PREVENT YOUR GASHOLDER CUPS FROM FREEZING

BY USING

CLAYTON'S

IMPROVED ANTI-FREEZING APPARATUS

It is the CHEAPEST, SIMPLEST, and MOST EFFECTIVE in the Market.

CLAYTON, SON, & CO., Ltd., Gasholder and Boiler Works, HUNSLET, LEEDS

R. DEMPSTER & SONS, LTD.

GASHOLDERS,

STEEL, WROUGHT AND CAST IRON TANKS,

AND

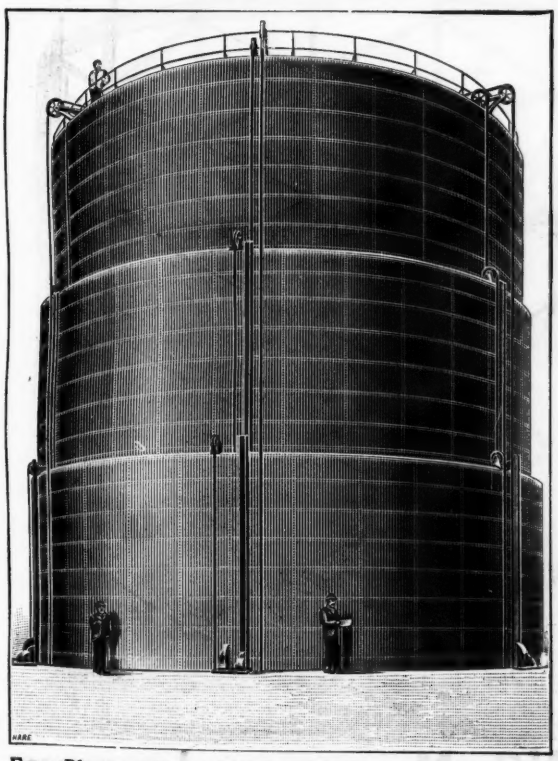
EVERY DESCRIPTION OF GAS APPARATUS.

Elland, Yorkshire.

ASHMORE, BENSON, PEASE, & CO., LIMITED,

GAS-WORKS CONTRACTORS,

STOCKTON-ON-TEES.



From Photo. of Three-Lift Roped Holder, 50 feet diameter by 18 feet deep each Lift. Erected at Sligo, 1894.

Pease's Patent Roped Gasholders

THESE HOLDERS HAVE WORKED SUCCESSFULLY UNDER EVERY TEST TO WHICH THEY HAVE BEEN SUBJECTED SINCE 1889.

MAY BE SEEN AT MANY PLACES.

Send for Catalogue if requiring increased Storage.

The security afforded by this System is shown by the working of the Three-Lift Holder, the subject of this engraving; not only was the Holder unaffected by the recent heavy gales, but also the recorded strain on the Ropes was remarkably small.

London Office: 15, VICTORIA STREET, S.W.

Telegrams { "GASHOLDER, STOCKTON-ON-TEES." "APPARATUS, LONDON."

THE

MAXIM PATENT CARBURETTOR

FOR ENRICHING GAS IN BULK.

Over 50 Maxim Patent Carburettors have now been fixed, capable of enriching

650,000,000

CUBIC FEET OF GAS PER DAY.

Among the Companies supplied are The Gaslight and Coke Company, the South Metropolitan Gas Company, Birmingham Corporation, Manchester Corporation, Rochdale Corporation, Bristol Gas Company, and many other Works, both large and small, where they have been working in some instances for the past **FOUR YEARS.**

More Gas and saleable Coke per ton of Coal Carbonized is produced; saving Capital, Labour, Fuel, Wear and Tear, &c.

The Enrichment is **INSTANTANEOUS** and **PERMANENT.**

The Carburettor is inexpensive, easily fixed, and entirely supersedes the use of Cannel.

FOR PRICES AND FULL PARTICULARS, APPLY TO

THE GAS LIGHTING IMPROVEMENT COMPANY, LIMITED,

18, DEVONSHIRE STREET, BISHOPSGATE, LONDON, E.C.

Dealers in Carburine and all other Naphthas for the Enrichment of Gas.

CUTLER'S PATENT GUIDE-FRAMING

SAFE. CHEAP.

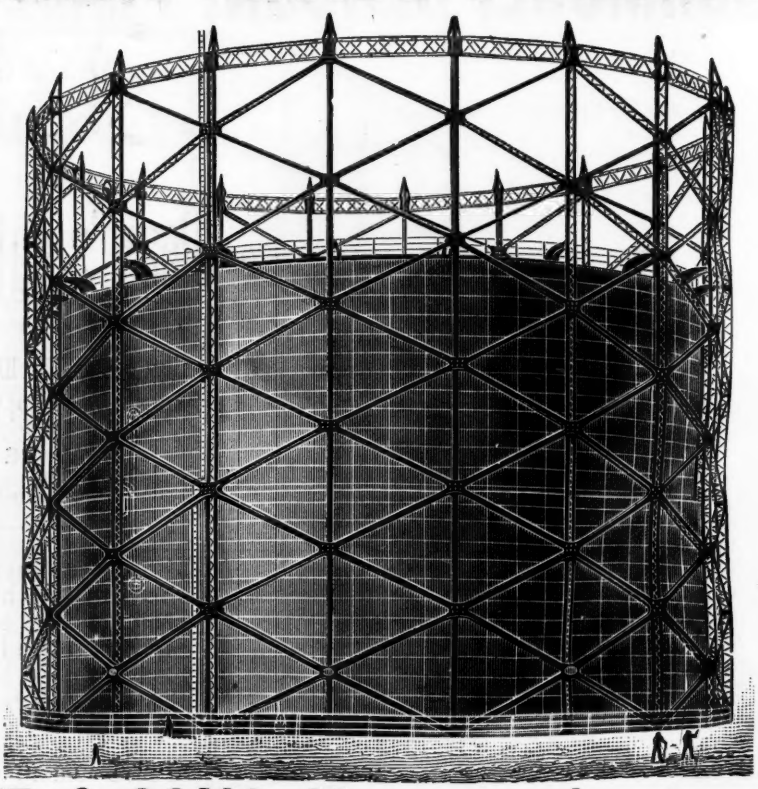
BEST POSSIBLE DISPOSITION OF MATERIALS.

SAVING IN COST OF TANK AS NO PIERS ARE REQUIRED.

EASY TO TRANSPORT and ERECT.

Adopted at the following Places:—

			Ft.	In.		Ft.	In
TUNBRIDGE WELLS .	2	Lifts	112	0	×	35	0
SHANKLIN	2	,,	60	0	×	20	0
HORNSEY	3	,,	110	6	×	35	0
SOUTHEND	2	,,	90	0	×	25	0
HULL	3	,,	81	6	×	30	0
ST. ALBANS	2	,,	68	0	×	22	0
ROCHDALE	4	,,	150	0	×	34	0
SUNDERLAND. . . .	3	,,	150	0	×	32	0
RYDE, I. of W. . . .	2	,,	82	0	×	25	0
COPENHAGEN. . . .	3	,,	175	0	×	30	0



SAMUEL CUTLER & SONS, MILLWALL, LONDON.

AMERICAN CANNEL.

Table of Analysis of the leading Scotch and English Cannels (from reports made by Mr. Geo. R. Hislop, F.C.S., F.R.S.S.A., Gas Engineer, of Paisley, Scotland), showing their value for Gas Enriching, as compared with the "Bear Creek" Cannel (50-inch vein), owned and mined by the Log Mountain Coal, Coke, and Timber Company, of Pineville, Bell County, Kentucky, U.S.A., as per report made by Mr. Hislop, dated Oct. 26, 1893.

NAME.	Gas per Ton of Coal in Cubic Feet.	Illuminating Power of Gas in Standard Candles.	Durability of one Cubic Foot of Gas by 5-inch Flame. Min.	Sec.	Value of Gas from one Ton of Coal in Pounds of Sperm.	Sulphur in Volatile Matters.	Coke per Ton of Coal in Pounds.	Quality of Coke, Ash per Cent.
LESMAHAGOW	13,201	34·52	66	40	1562·0	0·53	1019	10·60
Tyne Boghead	13,155	38·22	73	36	1723·0	0·38	1301	17·20
Arniston	12,560	35·46	69	0	1527·0	0·34	906	6·33
Newbattle	12,461	35·34	69	30	1509·0	0·51	983	7·00
Niddrie No. 1	12,330	32·45	62	30	1371·8	0·43	1074	4·80
Kinneil	12,070	30·89	66	0	1277·0	0·67	1230	8·02
Balbardie	12,083	34·31	65	47	1421·0	0·23	1056	4·13
BEAR CREEK	14,630	41·24	78	45	2069·0	0·41	995	7·70

THERE'S NOTHING LIKE IT!!

"BEAR CREEK" has absolutely NO EQUAL as a Gas Cannel. Our LOW PRICE is made possible by the thick Seam—50 inches, solid, pure Cannel—and by the low cost of Mining (surface drift).

☞ *WE HAVE AN ENORMOUS QUANTITY; our Engineers' estimate being 5000 to 6000 acres—6000 tons per acre.*

THE UNIQUE FEATURE.

High yield of very Rich Gas, and a splendid, Light Spongy Coke—equal to that derived from best Gas Coals.

READ THE FOLLOWING EXPERT OPINIONS.

Mr. JOHN METHVEN, Assoc.M.Inst.C.E., Gas Engineer, Beckton (London), after personal test of eighteen Experiments, says—
"The results are sufficient to stamp this Cannel as being one of the most valuable obtainable. Not only does it possess a high yield of very rich gas, but its production of coke is of large quantity and of a quality rarely found in Cannels producing such a rich volume of gas."

Mr. GEO. R. HISLOP, F.C.S., F.I.Inst., F.R.S.S.A., Gas Engineer, Paisley, Scotland, says—
"This is a Cannel Coal of exceptional value, as it is one of remarkable light-giving power and purity; yielding, as it does, a sperm value of illuminating matter amounting to **2068·69** lbs. per ton, while at same time affording a light and spongy coke of excellent quality. The Coal contains a very small percentage of both water and sulphur. Compared with Main Lesmahagow Cannel Coal, represented by 100 (calculated on the basis of a production of 13,000 cubic feet of gas and 1535·5 lbs. of sperm per ton, and having regard also to the value of the secondary products and the cost of the purification of the gas), this Coal is equal to **137·11**."

Detailed Analysis and Copy of Letters from fifteen American Gas Engineers sent on application.

Shipping Ports: NORFOLK AND NEWPORT NEWS, VIRGINIA, AND PENSACOLA, FLORIDA.

OWNED AND MINED BY

The Log Mountain Coal, Coke, and Timber Company,

PINEVILLE, KENTUCKY, U.S.A.

Sales Agents for Europe and South America: WM. J. WILSON & CO., Suffolk House, Cannon Street, London, E.C.

Telegraphic: "Fortress, Donnington, Salop." **C. & W. WALKER,** *Telegraphic:* "Fortress, London."

MIDLAND IRON-WORKS, DONNINGTON, NEAR NEWPORT, SHROPSHIRE.

London Office: **10, FINSBURY SQUARE.**

PURIFIERS with Planed Joints.

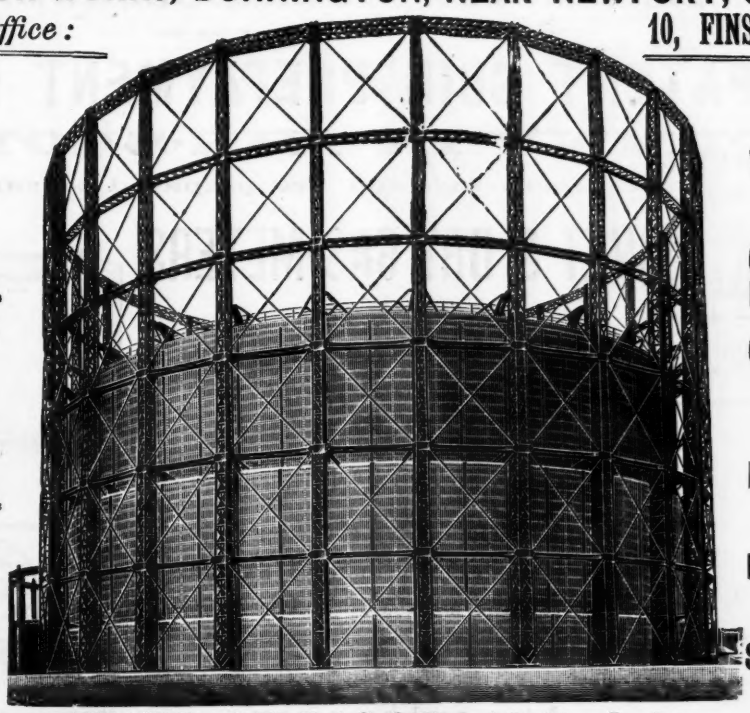
TOWER SCRUBBERS.

WECK'S PATENT CENTRE-VALVE.

CONDENSERS.

TAR PLANT.

SULPHATE OF AMMONIA PLANT.



Eight Million Cubic Feet Gasholder at Beckton, London.

WASHERS.

WASHER-SCRUBBERS.

CLAUS' SULPHUR-RECOVERY PLANT.

CENTRE & FOUR-WAY VALVES.

CRIPPS' HYDRAULIC MAIN VALVE.

RETORT-MOUTHPIECES.

SLIDE-VALVES, TAR-BURNERS, SIEVES.

WALKER'S PATENT PURIFYING-MACHINE.

JOSEPH CLIFF & SONS,

INCORPORATED IN
THE LEEDS FIRE-CLAY COMPANY, Ltd.,
WORTLEY, LEEDS.

LONDON OFFICES & DEPÔTS:
Baltic Wharf, Waterloo Bridge.
WHARVES NOS. 2 & 4, INSIDE G.N. GOODS YARD, KING'S CROSS, N.
LIVERPOOL:
16, Lightbody Street.
LEEDS:
Queen Street.

MACHINE-MADE RETORTS

Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

TELEGRAPHIC ADDRESS:
"ROBUSTNESS LONDON."

GAS & WATER WORK.

J. & H. ROBUS,

ENGINEERS & CONTRACTORS,
20, BUCKLERSBURY, LONDON, E.C.

Furnish Plans, Estimates, and Specifications for SINKING BOREHOLES *and* WELLS; *erecting* RESERVOIRS, FILTER-BEDS, *and* GASHOLDER TANKS; *and* EVERY REQUISITE *for* GAS *and* WATER WORKS,

INCLUDING

MAIN LAYING

EXCHANGE TELEPHONE 1756.

JOHN BROWN & CO., LTD., SHEFFIELD,

Proprietors of

ALDWARKE MAIN CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.

ALDWARKE MAIN GAS COAL

Analysis: 12,600 feet of 19-candle gas per ton.

Weight of illuminating power in pounds of sperm, 820·80. Very free from impurities.

Telegrams: "ATLAS SHEFFIELD."

GEORGE ORME & CO.

ATLAS METER WORKS, OLDHAM.

ORME'S PATENT COIN PREPAYMENT METERS.

PENNY-IN-THE-SLOT.

We are Manufacturing, and are prepared to supply,

Wet Coin Meter in Tin-Plate Case.

WET & DRY GAS-METERS

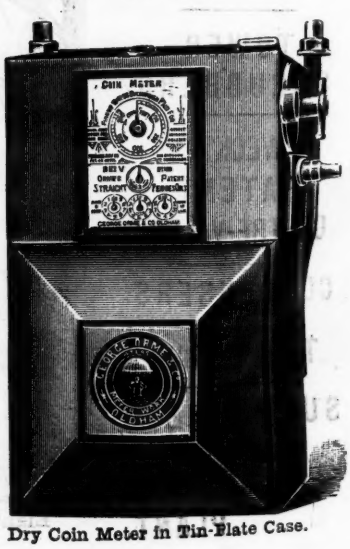
As follows:—

Wet Meters in Cast-Iron and Tin-Plate Cases, and Dry Meters in Tin-Plate Cases, fitted with our

New and Improved Patent Attachment,

giving a definite quantity of Gas per Penny. This Attachment will be found **STRONG** and **SIMPLE**; and the Selling Price of Gas can readily be altered *in situ*.

A large number now in use.



Dry Coin Meter in Tin-Plate Case.

Any further Particulars, Prices, &c., will be given on application.

Telegraphic Address: "ORME, OLDHAM." A.B.C. Code (4th Edition) used. National Telephone: No. 93, Oldham.

WEST'S GAS IMPROVEMENT COMPANY, LTD.,

ALBION IRON-WORKS, MILES PLATTING, MANCHESTER.

AND

104, Queen Victoria St.,

LONDON, E.C.

WEST'S

MANUAL

AND

POWER

MACHINERY

FOR

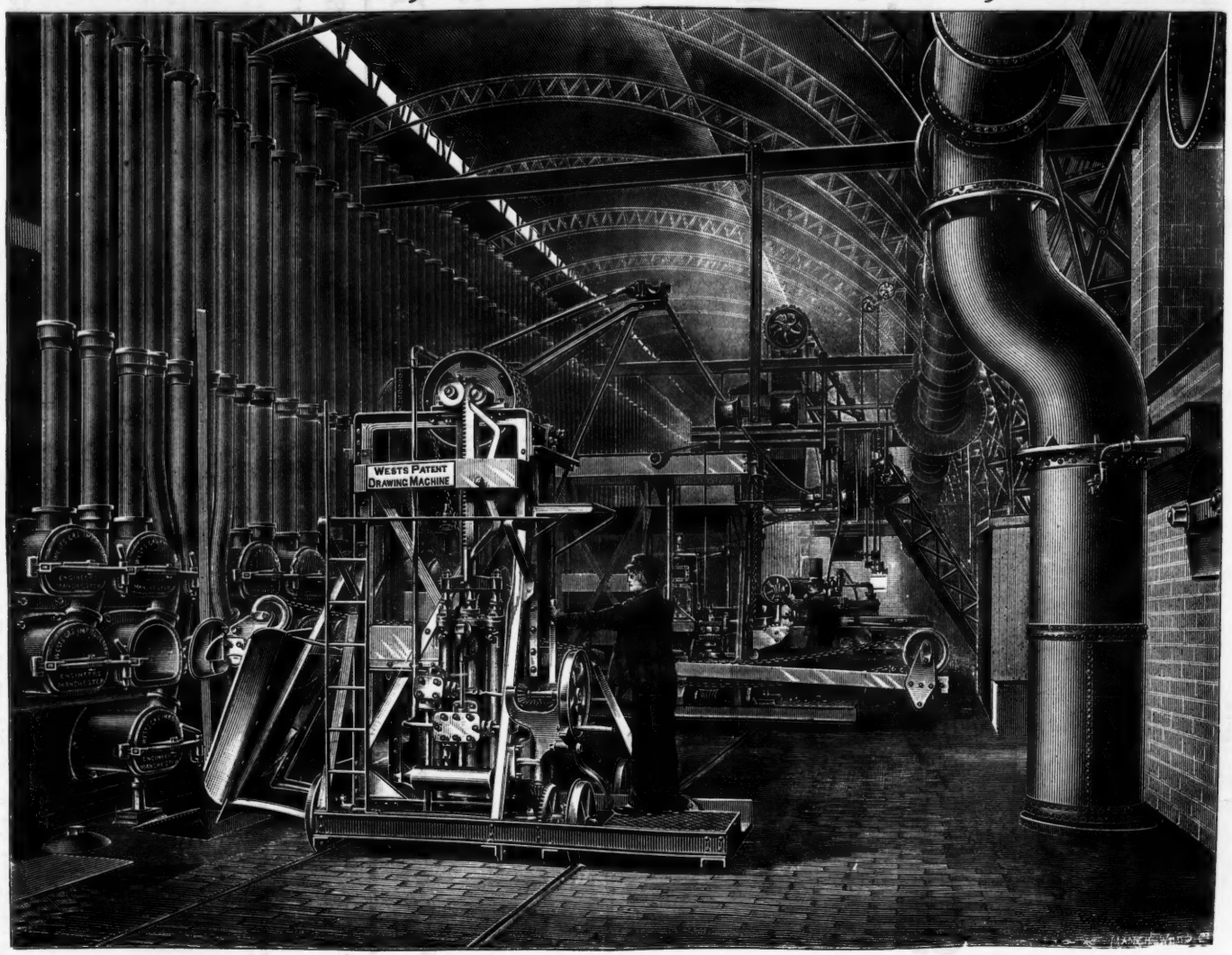
CHARGING

AND

DRAWING

GAS-

RETORTS.



Interior of Retort-House at the Bradford Road Gas-Works, Manchester, showing the Compressed-Air Drawing and Charging Machines.

AND

104, Queen Victoria St.,

LONDON, E.C.

OVER

560,000

LINEAL

FEET

OF

RETORTS

DAILY

ARE CHARGED

AND DRAWN BY

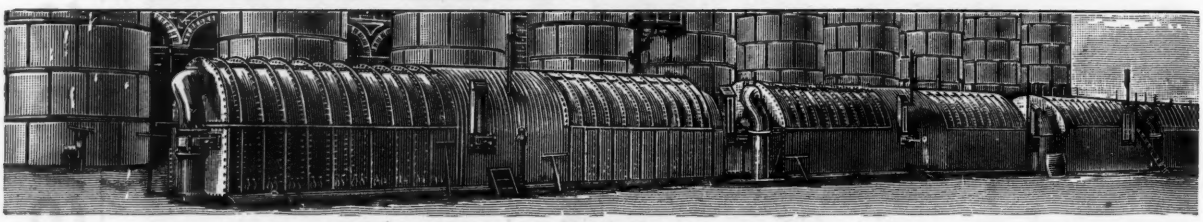
WEST'S

MACHINES.

KIRKHAM, HULETT, & CHANDLER, Ld.

PATENT "STANDARD" WASHER-SCRUBBER

☞ **484** of these Machines (capable of dealing with **464,490,000** cubic feet of Gas daily) in use, which fact is given as evidence of this apparatus being the Most Efficient of any in the Market for the extraction of Ammonia, Carbonic Acid, and Sulphuretted Hydrogen from Coal Gas.



View of SIX PATENT "STANDARD" WASHER-SCRUBBERS, erected at the Beckton Station of The Gaslight and Coke Company (the Engines driving same being under Galvanized Iron Covers). This Company have 30 of these Machines in use. They are also in operation at a great number of Gas and other Works in this Country and Abroad.

Sole Agents in Great Britain for Marshall's Patent Tar-Extractor.

Address: 3 & 4, Palace Chambers, Bridge St., Westminster, S.W.

JAMES & WILLIAM WOOD, Limited,

GAS COAL AND CANNEL CONTRACTORS AND EXPORTERS,

57, GRACECHURCH ST., LONDON, E.C.

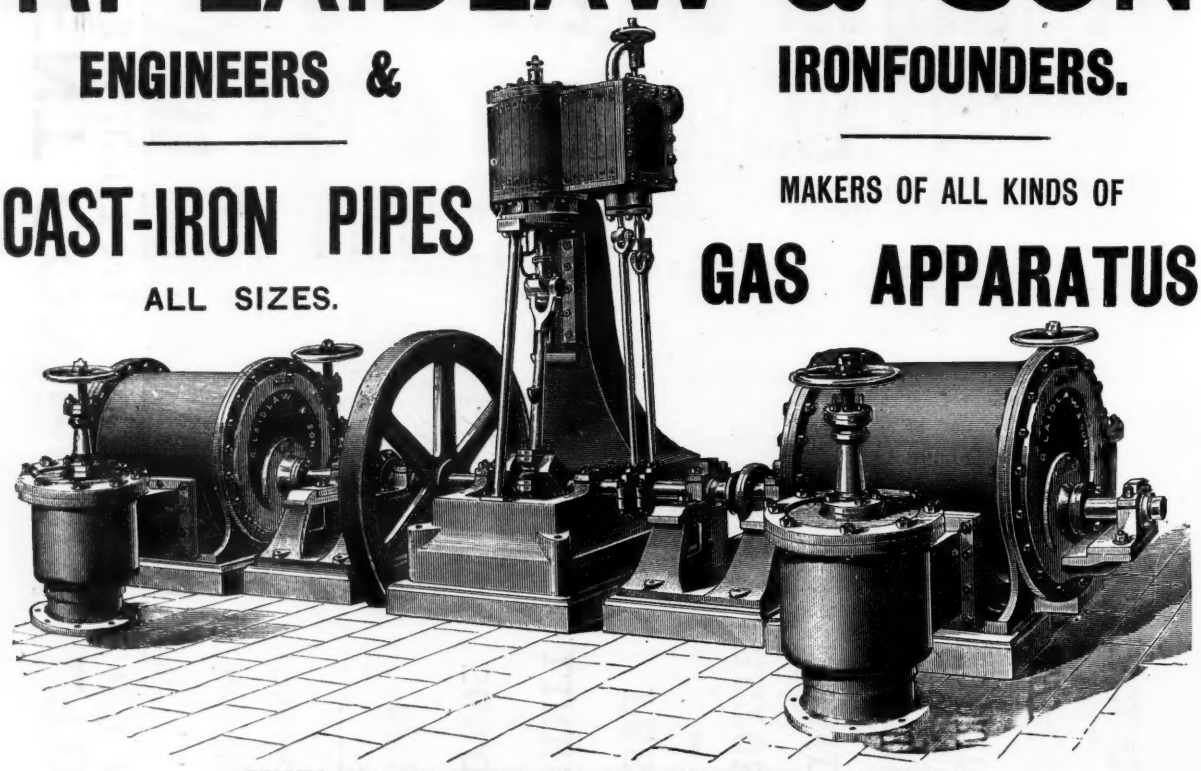
Registered Office—28, ROYAL EXCHANGE SQUARE, GLASGOW.

R. LAIDLAW & SON

ENGINEERS & IRONFOUNDERS.

CAST-IRON PIPES
ALL SIZES.

MAKERS OF ALL KINDS OF
GAS APPARATUS

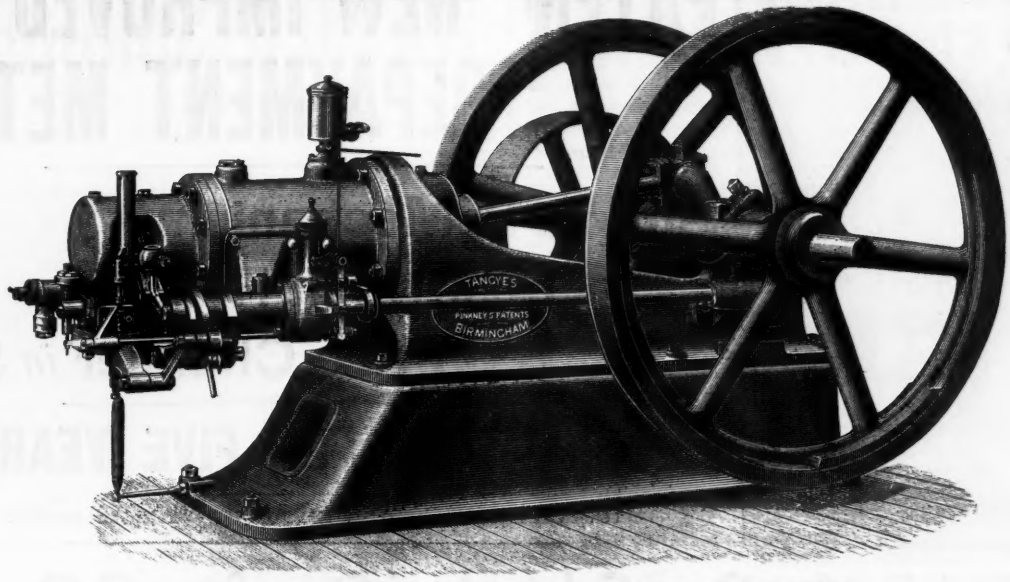


BEALE'S GAS EXHAUSTERS AND ENGINE COMBINED—ALL SIZES.

ALLIANCE FOUNDRY, GLASGOW. | SIMON SQUARE WORKS, EDINBURGH. | 6, LITTLE BUSH LANE, LONDON, E.C.

TANGYES GAS-ENGINE

"OTTO" PRINCIPLE. PINKNEY'S PATENTS.



THE 12-HORSE POWER (NOM.) ENGINE.

ENGINES OF ALL SIZES.

TANGYES LIMITED, BIRMINGHAM;

AND AT

LONDON, NEWCASTLE, MANCHESTER, GLASGOW, SYDNEY, JOHANNESBURG, BILBAO, ROTTERDAM, and BELFAST.

Telegrams: "TANGYES, BIRMINGHAM." No. 98 E.

THE HORSELEY CO., LTD., TIPTON, STAFFORDSHIRE.

MAKERS OF

GASHOLDERS & GAS PLANT.

PURIFIERS, SCRUBBERS, CONDENSERS, WASHERS, TANKS, VALVES, PIPES, LAMP PILLARS, RETORT-FITTINGS, ETC.

ALSO ALL KINDS OF

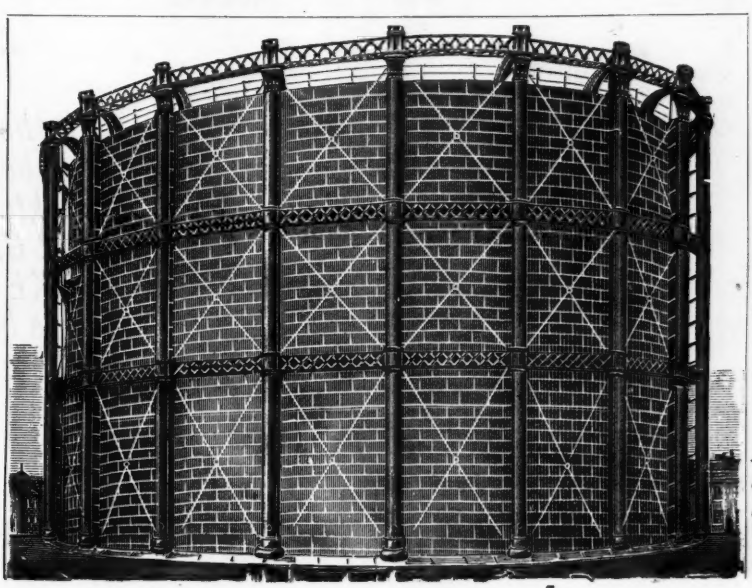
STRUCTURAL IRON

AND STEEL WORK,

BRIDGES,

ROOFS,

PIERS, ETC.



WORKS AND HEAD OFFICE

TIPTON,

STAFFORDSHIRE.

LONDON OFFICE:

11, VICTORIA ST.

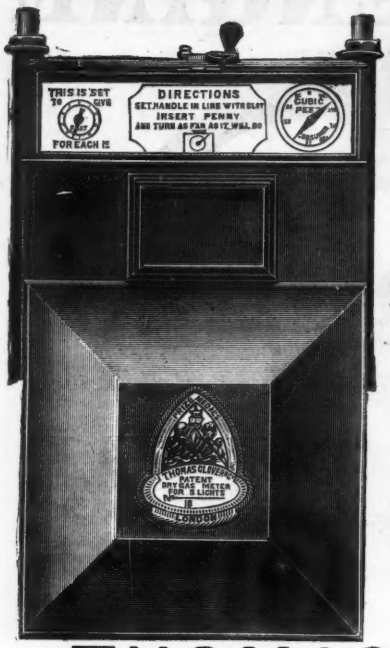
WESTMINSTER.

TELEGRAPHIC ADDRESSES:

"HORSELEY, TIPTON."

"GALILEO, LONDON."

THOMAS GLOVER & CO.'S



PATENT NEW IMPROVED PREPAYMENT METER

Simple in Mechanism.

Positive in Results.

Price Changer *in Situ.*

GUARANTEED FOR FIVE YEARS.

Telegraphic Address: "GOTHIC LONDON." Telephone No. 6725.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.

BRISTOL: 62, VICTORIA STREET. *Telegraphic Address: "GOTHIC."*

BIRMINGHAM: 3, BRIDGE ROW, DERITEND. *Telegraphic Address: "GOTHIC."*

LEEDS: BOAR LANE CHAMBERS, 4, BASINGHALL STREET. *Telegraphic Address: "GOTHIC."*

MANCHESTER: 37, BLACKFRIARS STREET. *Telegraphic Address: "GOTHIC."*

W. PARKINSON & CO.

SQUARE STATION METERS.

All the Meters (which number 14) at the Beckton Station of THE GASLIGHT AND COKE COMPANY have been erected by the above Firm.

COTTAGE LANE WORKS, CITY ROAD,

LONDON.

Telegraphic Address: "INDEX."

BELL BARN ROAD WORKS,

BIRMINGHAM.

Telegraphic Address: "GAS-METERS."

CONTENTS.

EDITORIAL NOTES:— PAGE

GAS, LIGHTING, &c.—
- Opposition to the Second Reading of the South Metropolitan Bill 473
- The Midland and Manchester Meetings 474
- Provincial Gas Affairs 474
- Sodium in the Streets 474
- Proposed New Factory Legislation 475

WATER AND SANITARY AFFAIRS—
- The Position of the London Water-Works Purchase Question . . 475
- The London Press and the Water Question 476
- General Scott's Report on the Quality of London Water . . . 476
- The Payment of Interest out of Capital 476

ESSAYS, COMMENTARIES, AND REVIEWS:—
- Gas and Water Companies in the Stock Market 477
- Electric Lighting Memoranda 477
- The Relative Cost of Gas and Electric Light Works 478

NOTES:—
- The Impurities in London Snow 479
- The Cementitious Value of Lime 479
- Straightening of Leaning Chimneys 479
- Gas Power Propulsion for Barges 479

TECHNICAL RECORD:—
- Midland Association of Gas Managers—Annual Meeting in Birmingham—
  - General Business 479
  - Inaugural Address of Mr. G. Winstanley. 480
- Manchester District Institution of Gas Engineers—Annual Meeting in Manchester—
  - General Business 483
  - Inaugural Address of Mr. G. Smedley 484
  - The Absorption of the Illuminating Constituent of Coal Gas by Tar 484

REGISTER OF PATENTS:—
- Gas and other Internal Combustion Engines—Foster, H. F. . . 486
- Prepayment Gas-Meters—Thorp, T., Marsh, T. G., and Haynes, J. 486
- Increasing and Regulating the Pressure of Gas in Houses, Factories, &c.—Jameson, J. 487
- Electric Lighter for Gas-Burners—Peterson, M. 487
- Pipe-Joint—Menzies, J. 488
- Guard for the Mantles of Incandescent Gas-Lamps—Duncan, W. . 488
- Controlling the Supply of Gas to Stoves—Voisey, C. B., and Richmond, E. W. T. 488
- Hand Starting-Gear for Gas-Engines—Armstrong, T. H. . . . 488
- Gas-Stoves—Dresser, W. 488
- Patent Notices 489

CORRESPONDENCE:—
- Mr. L. T. Wright's Paper at the Society of Chemical Industry . 489
- Peebles Oil Gas below Freezing-Point 489
- The Relative Efficiencies of Acetylene and other Artificial Illuminants 489
- The Restoration of Persons Overpowered by Gas 490
- The South Metropolitan "Workman-Director" Proposal . . . 490
- M. Berthelot on the Combustion of Hydrocarbonaceous Compounds 490

PARLIAMENTARY INTELLIGENCE:—
- House of Lords—Progress of Bills 490
- House of Commons—The London County Council and the Water Supply; South Metropolitan Gas Bill; Progress of Bills . . . 490

MISCELLANEOUS:—
- The Board of Trade Report on the Gas, &c., Bills and Orders of the Present Session 494
- The Explosions in Electric Lighting Boxes—The Cause Discovered 494
- Meeting of the Tottenham and Edmonton Gas Company . . . 494
- Meeting of the Croydon Commercial Gas Company 495
- Provincial Gas and Water Companies 496
- Gas-Works Extensions at Walsall—Local Government Board Inquiry 499
- The British Gaslight Company's Bill—Ratepayers' Meeting at Hanley 499
- The Financial Aspect of the London Water Question 500
- The York Corporation and the Water Company's Bill—Important Concessions by the Company 501
- Extension of the Dublin Corporation Water-Works 501
- Notes from Scotland 502
- Current Sales of Gas Products 503
- Coal Trade Reports 503
- Gas and Water Companies' Stock and Share List 503

PARAGRAPHS:—
- Mr. D. Ford Goddard—Mr. T. Wallis 475
- Mr. E. Evans Cronk—Mr. W. Wrigley—Mr. W. H. Williams . . 476
- Messrs. Alex. Wright and Co.—The Bacteriology of Sewage—The Purification of Potable Water 486
- A Correction—Carburetted Water-Gas Plant for the Hornsey Gas-Works 490
- Reductions in Price—The London County Council and the Repayment of the Proposed Water-Works Purchase Loan—The Kingston-on-Thames Town Council and the Water Supply . . 494
- The Bridlington District Council and the Water-Works—Newark Corporation and the Gas Company 500
- The Merthyr Tydfil Water Bill 501
- Accident to a Cookery Teacher—New Joint-Stock Companies . . 503
- Gas Exhibition at Tunbridge Wells—The Price of Gas at Bexley Heath—Projected Abolition of Gas-Meter Rents at Leicester—Sales of Shares—A Gas Poisoning Case in Brompton—Opposition to the North Middlesex Gas Bill 504

TO SUBSCRIBERS.

The JOURNAL is published every Tuesday, price 6d.; by post, 6½d.

TERMS OF SUBSCRIPTION.

One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.

Payable in Advance.

If credit is taken, the charge is 25s. a year.

All communications, remittances, &c., to be addressed to

WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

Post-Office Orders should be made payable at the Chief Office, St. Martin's-le-Grand; Cheques crossed "Union Bank of London."

EDITORIAL NOTES.

Opposition to the Second Reading of the South Metropolitan Bill.

MR. JAMES ROWLANDS, M.P., is a practical politician who has succeeded in discovering and cultivating to some purpose that great requirement of all persons who desire to become personages—a mission. He has found in Metropolitan gas affairs a means to the end—notoriety—without which, in these pushing democratic days, an ordinary municipal politician or Member of Parliament cannot hope to "keep his end up" for very long. We have said all along that the recent reductions made in the price of gas by the Directors of The Gaslight and Coke Company, including the abolition of meter-rents, would be ascribed, not to the credit of the Company, but to Mr. Rowlands and his party of agitation. And so it is; for Mr. Rowlands is to be testimonialized on this account so soon as the materials for making up a "purse of money" can be collected from his admirers. The latest triumph of the member for East Finsbury has, however, not been gained at the expense of the Gas Company which serves his constituency, but in connection with the South Metropolitan Gas Company's Bill, which he attacked in very good form last Friday, on the order for second reading. We report the proceedings of the House in this matter at length elsewhere; for nothing that has appeared in the newspapers gives a proper idea of the case as made out for and against the Bill on this occasion.

It may be conceded at the outset that the step of calling the attention of the House to the South Metropolitan Bill in this unusual manner was justifiable in the circumstances. We have no fault to find with Mr. Rowlands, or with the posse of members for certain Metropolitan constituencies who had declared their intention of supporting him in his contemplated action. The issues involved in the renewal of the parliamentary compact with a Metropolitan Gas Company are so important that we should have wished the House of Commons to have been made fully cognizant of what was in progress in this regard upon the Company's initiative. The Company could have had no desire to do anything in regard to the amendment of their statutory constitution which would suffer by being brought to light; and, in taking the action he did, Mr. Rowlands so far did both the Company and the public good service. When the particular grounds of Mr. Rowlands's opposition to the Bill came to be stated, however, they presented a mixture of right and wrong, generals and particulars; and, upon his own showing, but one result could follow from the honourable member's motion to reject the Bill. Mr. Rowlands was unable to show good and sufficient cause why the measure should not go before an ordinary Committee in the usual course; and so he withdrew his motion. It transpired, however, by some passages between himself and the President of the Board of Trade, who almost invited him thereto, that the member for East Finsbury may, and probably will, move in a few days for the appointment of a Select Committee to inquire into the general subject of the gas supply of London; and some of the matters he mentioned on Friday last will then be gone into. This deserves to rank as a distinct "score."

So far as his protest against the Bill was concerned, it appeared that Mr. Rowlands had fallen into the error, exposed later by the President of the Board of Trade, that the proposed stock-conversion scheme is a stock-watering device. Better skilled men than Mr. Rowlands have committed the same mistake; but, in so far as he rested his case upon this misconception, it fell to the ground at Mr. Bryce's touch. Mr. Rowlands had other complaints to urge against the Company, or against the Bill as it stands. He commented upon the deleted proposal for the appointment of workmen directors, which it suited his purpose to pose as the real reason for the promotion of the Bill; and he strove hard to damage the conversion scheme by arguing that it would unduly benefit the holders of the large proportion of stock which was not acquired under the auction clauses. He had a fair point in the latter argument, but failed to handle it to the best advantage. The weakness of it consists in the fact that the position of holders of original stock in relation to purchasers of stock in the market does not come into question under the Bill, having been settled when the auction clauses were first of all enacted.

Technically, and to some extent actually, the Bill, if

passed in its present shape, would benefit the Company; and this is the justification for parliamentary opposition to it until it can be shown what compensating advantage will be derived by the public. Inasmuch as the Company and the public are partners, what is beneficial to one must also be good for the other. But the House of Commons can hardly be expected to see this at a glance, or to regard it as sufficient even when understood. Mr. Howell, in supporting Mr. Rowlands, made a curious speech, from which the only thing we can gather is a general notion that the honourable member would have liked the Bill better if the workman-director part of it had not been dropped. He also said something about the Bill being a specimen of "cheap patriotism;" but what this means, and where it is shown, remain dark and unfathomable mysteries. Mr. Kimber spoke up well for the Bill; reminding the House that, though the much-talked-of workman-director clause was not in evidence in it, there were other provisions directly benefiting the working men shareholders.

Altogether, the Company have no reason to regret the holding of this discussion upon their proposals. They got a good word or two from several members, including the President of the Board of Trade; and the inevitable question as to the reassertion and confirmation of their parliamentary title, as Mr. Bryce called it, was shunted off from their private legislative line of action to the public proceedings in which Mr. Rowlands is even more interested, and which have more to do with the Chartered than with South Metropolitan affairs. What with the pending proceedings of the London County Council in relation to the Water Companies, and other considerations, it is more than probable that, if Mr. Rowlands presses for his Select Committee, he will get it; and then some interesting questions of Metropolitan gas administration that have had preliminary airings in the columns of the JOURNAL will have to be gone into thoroughly.

The Midland and Manchester Meetings.

Two District Associations of Gas Managers held meetings last week, as will be found reported in another column. The Midland meeting took place on Thursday in Birmingham, under the presidency of Mr. George Winstanley, of Coventry, and was well attended. Mr. Winstanley's address is mainly, and very properly, an epitome of the speaker's professional experience, and therefore contains many references to matters of general technical interest, and sheds some light upon the progress of a modern gas manager in the theory and practice of gas manufacture as understood and followed in this country. After the President came Mr. Henry Hack, who gave a very instructive account of the coal-carbonizing and labour-saving plant and machinery recently installed at Saltley, which the members subsequently inspected. This concluded the business of the meeting. The Manchester Institution met at headquarters on Saturday; but the prevalent sickness worked havoc with the attendance. Both the retiring and incoming Presidents—Mr. James Braddock, of Radcliffe, and Mr. George Smedley, of Buxton—were absent owing to this cause; and the chair was taken by Mr. Isaac Carr, of Widnes, now the Senior Vice-President. The presidential address was read, and one of its topics subsequently discussed on the initiative of Mr. G. Ernest Stevenson, of Manchester. Some discussion also took place upon the paper by Mr. W. R. Chester, of Nottingham, on the subject of greenhouse-heating by gas, which was read at the previous meeting of the Institution. Nothing further of a debatable nature transpired on this occasion; and it only remains for us to wish the invalided members of the Institution a quick and happy recovery and restoration to this and other of their accustomed spheres of usefulness.

Provincial Gas Affairs.

THE reports of Provincial and Suburban Gas Companies' meetings, which have recently appeared in our columns, do not present any particular features calling for special notice here. All the undertakings in question have been doing very well, in the commercial sense; and very many of them, we are pleased to be able to say, also give indications of being in the right path of technical advancement. The consumption of gas is everywhere increasing; and the condensed reports frequently make mention of reductions in price, the introduction of mechanical appliances in gas manufacture, and similar points of progress. At the same time, it is impossible even to glance at a few of these reports without perceiving how individualized, if we may employ the term, is the gas industry of these kingdoms with regard to the places in which it is carried on. It is more or less profitable everywhere; and it is to be supposed that the methods of manufacture and other chief features of the industry are pretty much the same in all undertakings. But there is very great variation in the local conditions which determine the policy of a gas administration. Many gas managers doubtless envy the circumstances in regard to capital, for example, of the Newcastle and Gateshead or the Plymouth and Stonehouse concern. The latter Company can sell gas at 1s. 9d. per 1000 cubic feet, largely because their capital works out to less than £2 per ton of coal carbonized. Some undertakings double their output every dozen years or so; others keep on steadily with just sufficient growth to show that the organization is really alive. The circumstances of the different Companies are the result of many influences—some historic, others of continuing force. Taking them all together, however, the thing to be most afraid of, in their present state, is not adversity, but prosperity. The chief dangers that may be expected to environ the gas industry of the United Kingdom in the immediate future are those that surround wealth and success in all shapes; and those gas administrators will be wisest who make the best use of a period of thriving trade in placing themselves well up in the esteem of the public they serve. We are no advocates of popularity-hunting as a policy for Gas Companies or any other traders, apart from the plain, straightforward way of business. But all the same, when the Gas Company of a town is not popular, in the same sense as any other commercial house of repute in the locality can be described as popular, there is generally some reason for it in hard, uncommercial, unsympathetic administration, a stupid or miserly directorate, officialism in the secretary's or manager's department, or perhaps only the lingering tradition of some such failing. It is these shortcomings, even more often than high charges for gas (which are traceable to historical causes), which render some Gas Companies unpopular in their districts, and sow their path with difficulties.

Sodium in the Streets.

A VERY remarkable discovery has been made by Major Cardew, the Electrical Adviser of the Board of Trade, in connection with the recent street conduit-box explosions in the St. Pancras district; and it has been communicated to the newspaper press. The state of the St. Pancras electrical distributing plant had already been adversely criticized by Major Cardew; and now he finds that the deposit on some of the insulators, suspected of being instrumental in causing the recent explosions, contains "a considerable "quantity of the metal sodium." The gravity of this discovery is obvious. The Board of Trade think that "the "presence of this metal, which is highly inflammable by "contact with water, appears to be so grave a source of "danger, and to afford so reasonable an explanation, in con"nection with the accumulation of escaped coal gas, of the "several explosions which have recently occurred," that the Department must look into the whole matter forthwith, in conjunction with the Royal Society and the Institution of Electrical Engineers. In the meantime, the Vestry are urged to take practical steps to reduce the risk of explosions. The Electricity Committee of the Vestry had a special meeting to consider the statement of the Board of Trade; and they offered sundry observations thereupon, concluding with an expression of the "hope "that the Board of Trade would bring pressure to bear on "the Gas Company to remedy the defective state of gas "mains and services in this district, and thus remove the "primary cause of the explosions." Of course, the vestrymen know very well it is impossible for either themselves or the Board of Trade to increase the sense of responsibility felt by the Gas Company for the condition of their mains and services. If the gas-distributing plant in the St. Pancras district is old, and open to suspicion of general weakness, the Company will doubtless have it relaid at the earliest possible moment. But it is beyond human power to prevent occasional escapes of gas from a distributing network maintained constantly under pressure beneath the surface of roads and street pavements in use for all sorts of other purposes; and it is for the owners of electrical culverts to see to it that these do not increase the ordinary hazards of the streets.

Proposed New Factory Legislation.

On Friday evening last, the Home Secretary, Mr. Asquith, introduced the Government Bill "to amend and extend "the law relating to factories and workshops;" and the measure was very well received by representatives of all parties in the House of Commons. So far as can be made out, there is nothing in the Bill specifically affecting gas-works; nor was the way in which the gas industry is conducted mentioned in the Home Secretary's speech, although certain of the provisions relating to the prevention of accidents and the inspection of machinery may apply to gas-works as to other factories. An important amendment of the law is proposed in regard to apparently dangerous machinery, as to which the existing law is certainly in an unsatisfactory condition according to Mr. Asquith's showing. He stated that there is no power at present to put a stop to the working of machinery known to be dangerous, but that an "accident" must happen first, and then the civil and criminal law can be put in action. This is to be altered by giving powers to a Court of Summary Jurisdiction to act on the motion of an inspector, and to require such machines to be disused until they have been put into a proper condition, or, if incapable of that, to be discontinued altogether. Furthermore, the Government regard this matter as so important, that they propose to enable the Magistrate, upon a complaint being lodged, to make an interim order *ex parte*, until the case can be heard in the ordinary way. There are also to be some technical provisions to simplify and extend the law in relation to the notification of accidents; and the Secretary of State is to be empowered to order an inquiry to be made into any accident in a factory or workshop. Of course, all this means a good deal more "government" of factories and workshops than either owners or workpeople have been accustomed to. But, as Sir Henry James remarked, factory legislation is necessarily progressive, and as public opinion changes in respect to the conditions under which organized labour in workshops should be carried on, the law must be continuously amended to keep pace with the opinion of those whom it affects. Mr. Asquith's rule in this regard is that the aim and scope of all factory legislation should be "to provide for all classes of workers "to whom it applies those reasonable conditions of safety "for life and health which are, in fact, observed by wise "employers and well-conducted undertakings." Nobody can object to this as a principle; but certain applications of it might conceivably be irksome to the best of employers, as an ex-Home Secretary—Mr. Matthews—justly observed in regard to the multiplication of returns to the Home Office. Mr. Matthews said on this head "he was "just afraid the unhappy owner of a factory or workshop "was somewhat overburdened already with returns, and "that any additional duty imposed in this way would lead "to the work being done loosely and inaccurately." This is, however, the penalty paid by all manufacturers for the lapses of some of their number; and no wise employer will kick against reasonable precautions instituted with the object of preventing "cheap and nasty" shops from being worked to his detriment under illegal and unfair conditions. It might have been thought that such a debate as that upon the introduction of Mr. Asquith's Bill would not have furnished an opening for casting a slur upon Gas Companies; but, as a matter of fact, the ingenuity of Mr. John Burns was equal to making one. The member for Battersea took occasion to tell the House that "gas-works owned by municipalities, "and at which continuous work was carried on, had "voluntarily, and partly through the pressure of organized "public opinion, adopted eight-hour shifts." Nobody appeared to notice this utterly misleading statement; but we take the liberty of observing that, for a professional labour leader, Mr. John Burns seems to be singularly ill-informed on a number of industrial matters. From something he said about the gas supply of Liverpool while in America, it would appear that he is ignorant of the extent to which gas supply has not been taken over by British municipalities, which may explain his blunder of Friday.

Mr. D. Ford Goddard, who unsuccessfully contested Ipswich in the Liberal interest at the last election, has been again selected as a candidate.

Mr. T. Wallis has been appointed a Director of the South Shields Gas Company, in place of Alderman J. Readhead, J.P., deceased.

WATER AND SANITARY AFFAIRS.

The success of the Moderate candidates in the election for members of the London County Council last Saturday so affects the constitution of that body as to render possible an entire reversal—and certainly an arrest—of the policy hitherto pursued at Spring Gardens. With reference to the proceedings in Parliament last week, we observe that the Transfer Bills relative to the Lambeth and the Southwark and Vauxhall Water Companies having been pressed to their second reading ten days ago, the Bills by which the other six Companies are to be dealt with were, by a resolution in the House of Commons last Thursday, made to await their second reading some two months hence. Can any satisfactory reason be given for such an extraordinary arrangement? Mr. Stuart has declared "the "only reason" to be that it was impossible to deal with all the Bills simultaneously. Certainly the representative of the late County Council on this question has done his best to render any simultaneous action impossible. This extended interval between the second reading of two of the Bills and the approach to the same stage with the remaining six, exposes the latter to the risk of being pushed out of the session altogether. The ready acceptance by Sir F. Dixon-Hartland and Mr. Banbury of Mr. Stuart's assurance that the Council would not use the two Bills already read a second time for the purpose of putting pressure on the other Companies, was perhaps unavoidable; but it is not unlikely that Mr. Stuart, or at least his friends in the Council, will assign a limit to this concession. Possibly nothing will be done before May 3. But if the two Bills were to become law this session, and the other six to be dropped, what would then be the position of the Water Companies? Mr. Stuart is willing for all the Companies to appear on the first Bill that is taken in hand by the Select Committee; and it is difficult to discern any proper reason why there should be any severance between these Companies and their own Bills. We apprehend that the Progressives have no objection to the Companies being heard, so long as the half-dozen Bills are kept in abeyance. It is one of the marvels of the period, indicating the existence of a power which menaces the true interests of society, though happily now receiving a needful check, that the House of Commons should be made subservient to such patent manœuvres on the part of a municipal authority. It unfortunately happens that the forms of the House have interfered to prevent the adoption of a motion that the Select Committee should have power to amend the terms of arbitration. Mr. Stuart felt constrained to make this concession; but so far it has been nugatory. Perhaps the Hybrid Committee will see to it, in the absence of any instructions. We can hardly suppose but that the first Bill, if the new County Council will allow it to proceed, will be amended at some stage or other, so as to rectify the glaring injustice of the proposed scheme of arbitration. In fact, if the Bill is properly amended, including the matter of transfer before the settlement of a price, it is possible that the Progressives will themselves be ready to withdraw the several Bills from the consideration of Parliament. Certainly no such Bills ought ever to have been laid before the Legislature; and, in their present form, we can scarcely imagine they will ever pass, even supposing the Council should allow them to go on. Another matter bearing on this question has reference to the funds which may be required at an early date in effecting the purchase. At the last meeting of the Council, the Finance Committee reported that, at the suggestion of the Water Committee, they had introduced a clause in the Money Bill of the present session, similar to that in the Money Act of 1892 respecting the purchase of tramways, by which the Council were authorized to expend on capital account such sums as might become payable in respect of such purchase during the financial period. It is further proposed that the length of time over which the repayment of such money should be spread, "should not be "less than 100 years." This extension is probably designed merely to lessen the force of Sir John Lubbock's warning that, if the Council obtain possession of the water supply, the ratepayers will have to pay both for the water and the redemption of stock. What is likely to happen is perhaps shadowed forth by the decision of the House of Commons last evening, to postpone the further consideration of the Lambeth Water Bill nominally until next Thursday, apparently with the intention of allowing a further adjourn-

ment until the policy of the new County Council on the Water Question has been declared.

In the JOURNAL last week comment was made upon the debate in the House of Commons in relation to the London Water-Works Transfer Bills, and attention was directed to the sensible views concurrently expressed by *The Times* and the *Standard*. It is necessary to remember, however, that by another section of the press the unfair action of the County Council is being persistently whitewashed; while the wicked Water Companies are not less persistently held up to odium as a greedy and unpopular body of monopolists. More especially is this the line adopted by the *Daily Chronicle*, which has now constituted itself a bright particular star to guide the County Council on its confiscatory way. If it be true, indeed, as the *Chronicle* alleges, that the London Water Companies are to-day "the most "unpopular body of monopolists in the country," that view has been arrived at by reason of the sustained misrepresentations for which the *Chronicle* and certain other papers are largely responsible. For example, the very article in which the *Chronicle* discussed the recent debate in the House of Commons was simply an unblushing attempt to foster a spirit of "envy, hatred, malice, and all "uncharitableness" towards the Companies. There is, according to the *Chronicle*, nothing to be said in their favour; a nd there is nothing bad enough, according to the same authority, to say against them. It is charged against the Companies—without specifying which of them or when—that they have "answered complaints with curt "insolence;" and that they have virtually told the frozen-out Londoner that, "if he wanted his water, he could get "it himself or go without." Sir John Lubbock's amendment is described as being dishonest on the face of it; "the Companies have failed;" they supply us with a bad article at a high price; "they are draining the Thames "and the Lea, and some of them are giving us water "which has already passed the sewage of a million "people!" Such and such-like are some of the choice specimens of vituperation that the *Daily Chronicle*, which claims to be, and is in some respects, a great daily paper, thinks fit to use in reviewing a subject of great public interest—a subject, moreover, which demands broad and impartial consideration.

Passing from general abuse to particular argument, the *Chronicle*, with a judicial air that would be amusing if it were not so obviously insincere, contends that it is simply proposed "to pay a fair price for the first necessity of life." Would the *Chronicle* consider it fair in regard to any other purchase of property—a newspaper and all its works, for example—that it should be annexed first and paid for afterwards? or in effect that the property should first be acquired, and its value destroyed, before the purchase money could be talked about? The weighty arguments put forward by Mr. Chamberlain, Sir Richard Webster, and others, are, of course, pooh-poohed as the mere dishonest effort of a political clique; and, in order that there may be no mistake as to the supposed iniquity of the Companies, the *Chronicle* lays on a final coat of paint with the thickest possible smears. "These bodies," the writer continues, "have treated London with a tyranny which, "as every Conservative paper in London acknowledges, "has become simply odious." The only possible comment here is that the allegation is simply untrue. Equally false is it to declare that the Companies, pretending to compete, in reality represent a compact "ring" for the forcing up of water-rates, and that the policy of those who oppose the arbitrary action of the County Council means "nothing less than the bloating by "millions of the price which these omnipotent dealers "are attempting to fasten on the ratepayers." Sensible people will be able to discount all this vapouring; but there are others who cannot thus discriminate. The Companies must be prepared, therefore, for persistent distortion of their position and aims. The *Chronicle* is bent upon tickling the ears of the groundlings; and we can but hope that judicious and judicial journals like *The Times* and the *Standard* will continue to assist in providing an antidote to all this poisonous stuff, and insist that, since a fight is inevitable, even the Water Companies shall have fair play.

The report by Major-General A. de Courcy Scott on the water supply of the Metropolis in 1893, has recently been issued in the yearly Blue Book of the Local Government Board. The idea that the River Thames is inadequate for the supply of the Metropolis, in conjunction with the Lea and the deep wells, is clearly exposed as erroneous. There is abundant water; the only difficulty consisting in providing for a maximum demand in time of drought. The fluctuations in the volume of the Thames are such that, whereas the average amount at Teddington Weir—adding the quantity intercepted by the Water Companies—exceeded 3000 million gallons in February, 1893, the average in September was under 300 millions. More than one-third of the latter amount was withdrawn by the Water Companies; but in February the abstraction was only about one thirty-third part of the whole. Taking the average of the entire year, the full power of the Companies drawing from the Thames only extends to one-tenth of the absolute volume. "Thus," the report says, "the "average quantity of water daily extracted from the "Thames for the use of the Metropolis is but a small "fraction of the average amount of water discharged by "the river." The facts point to the importance of storage; and to this the report makes reference. But the steps which are being taken by the Companies to enlarge and extend their reservoirs are of necessity imperfectly recorded—the report being far from "up to date." Thus we are told that the Southwark and Vauxhall Company have a new reservoir in progress, "the completion of which is "expected in 1894." For later information, we must turn to the monthly reports of General Scott; and these are none too prompt, for which delay we must hold the Local Government Board responsible, rather than General Scott himself. It is certainly somewhat ludicrous to receive the November report on Feb. 1. Doubtless there have been special hindrances of late, for which due allowance must be made. But, as a general rule, the reports would be more interesting if they came more quickly after the event.

Decidedly interesting and very instructive was the brief discussion in which the Plymouth Corporation recently indulged, in reference to the question of paying interest, out of capital, on the money borrowed for extending the local water supply. The views expressed by some members of the Corporation serve to show how much "rope" a local authority may require in pursuit of a "spirited" policy. Not only, it seems, may a corporation need special indulgence in respect to the period at which repayment of borrowed money is to be commenced; but a new and special view of the fitness of things is introduced, in order that provision may be made for current interest on loans. A strange departure, truly! The Town Clerk, interrogated as to the legal aspect of the position, showed himself a model of professional caution. If they asked him whether the Special Act authorized the payment of interest out of capital, he replied, "No!" But he was not prepared to say it was not possible. "It might be "impossible"—probably it will be found impossible. But the Town Clerk is obligingly prepared to see what can be done; and, given a mandate from the Corporation, he is now going "to set his wits to work." The result of these cogitations will be awaited with interest. Meanwhile, we have the plain and immemorial principle that interest must *not* be paid out of capital, in the absence of express provision to the contrary. It would be distinctly contrary to public policy and sound finance to admit any insidious inroad upon this principle. If an exception is to be permitted in the case of Plymouth, why should it be forbidden in the case of other towns where the water supply is in the hands of a public body? Section 121 of the Companies' Clauses Act, 1845, expressly prohibits the making of dividends so as to reduce capital; and this enactment is but part of a general scheme of legislation directed against any mixing up of capital and revenue accounts. Interest and dividends alike should be provided out of revenue as far as it will go, and not from funds provided for capital expenditure.

Mr. E. Evans Cronk has accepted a seat on the directorate of the Sevenoaks Water Company, to fill the vacancy caused by the death of Mr. T. H. White.

Mr. W. Wrigley, who for a period of upwards of fifty years was in the service of the Liverpool Gas Company, recently succumbed to an attack of congestion of the lungs.

Mr. W. H. Williams, one of the Directors of the Truro Gas Company, died at his residence in that town on the 23rd ult., in his 67th year. Deceased was a member of the Corporation, and at the time of his death held the position of Chairman of the Improvement Committee.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 503.)

THE past week, was on the whole, a quiet one on the Stock Exchange, and at first the prevailing tendency was towards dulness; but the markets brightened up later on to a moderate extent, and closed about as well as they stood at any time of the week. Prices did not vary much, though there were a few exceptions. The settlement seems, taken all round, to have gone through without difficulties. Money was in good demand for the time; but nothing points to a change in the Bank rate, which has now stood at 2 per cent. for a clear twelvemonth. Business in Gas was fairly brisk, and, with two notable exceptions in which a slight retrograde step was made, quotations have moved up very freely. Gaslight "A" was active; but not quite so firm. There was, however, a disposition to recover at the close; and the last prices were nearly as good as the first. The secured issues were in good demand, and realized nice figures. South Metropolitans were quieter; but each transaction marked a high price; and the quotation of "A" advanced. The event of the week was the second reading of the Company's Bill in Parliament on Friday. A few transactions were marked in Commercials, showing an advance in the old stock; but there is so little stock in the market that it is hard to move. Business in Suburbans and Provincials was, like the thermometer recently, almost at zero. But very considerable improvements in value were made; the Brentford issues being most conspicuous. The advance in public favour which this class has steadily been making for some time past is remarkable. The Continentals were irregular. Imperial was a little flat, and fell back. But European and Union were firm; and the latter advanced in price. Undertakings in the remoter world presented no feature. The Water Companies were much excited; and dealings were sometimes a little wild. But signs are not wanting that calmness is about to be restored; and indeed already two important issues have effected a recovery, and they closed at an advance over the opening prices. Timid holders may derive some reassurance from the result of the County Council elections on Saturday, which has greatly lessened the forces of their foes.

The daily quotations were: The Gas Market opened on Monday with a very good disposition for the most part; high prices being readily obtained for almost everything. Brentford old improved 3; ditto, new, 5; and Brighton and Commercial old, 2 each. But Imperial Continental fell 2. Water stocks were still forced down. Lambeth, West Middlesex, and Southwark fell 2 each; ditto, "D," 4; East London, 3; and New River debenture, 1. But Kent recovered 2½. On Tuesday, Gas was very quiet; and the only move was a fall of 1 in Gaslight "A." In Water, Southwark fell 5; but Grand Junction recovered 1. More activity was apparent on Wednesday, coupled with strength in Gas. Gaslight "J" and Continental Union advanced 2 each. There was a slight further fall in Water; New River and Southwark "D" losing 2 each. Things remained at a balance on Thursday; and prices did not move at all, except for some nice advances in Gas stocks quoted *ex div.* Friday was only moderately active; and Gas remained unchanged. In Water, there was a recovery of 1 in East London; but Chelsea fell 2½, and Lambeth 1. Good progress in values was made on Saturday. South Metropolitan "A" advanced 2½; and Brentford old and new, 3 each. Water stocks also showed an improvement. East London and Lambeth 10 per cents. rose 1 each; and ditto 7½ per cents., 1½.

ELECTRIC LIGHTING MEMORANDA.

The Affairs of Metropolitan Electric Lighting Companies—An Electrician on the Welsbach Light—A Bold Advertisement.

SEVERAL of the Metropolitan electric lighting companies have held their ordinary general meetings during the past week; and every one of them claimed to be doing well, and to have hopes of doing still better. The largest of these undertakings—the City of London Company—has the advantage of being presided over by Sir David L. Salomons, whose address on the position and prospects of the concern was of a very informing and business-like character. He, of course, said nothing about the little weakness of the Company to which we alluded in the last number of the JOURNAL. In giving figures illustrating the growth of the Company's business during the last three years, he had the candour to tell the proprietors that the rate of increase recorded cannot go on for ever; and he is probably as anxious as everybody else to know what will eventually turn out to be the saturation-point of the Company's district, and when this will be reached. By this phrase we do not mean the stage at which all increase of business will stop, but only that which will be marked when the intending consumers who are actually waiting to be supplied are on the books, and further increase of trade will be only that which a fully established business may expect to pick up as time goes on. None of the Metropolitan electric lighting companies have reached this important stage as yet. But some of them are drawing near it; and when it comes, there must be an end of charging to capital the heaviest share of administrative and other expenses. Seeing that, with few exceptions, all these undertakings are confined to areas strictly limited, it cannot be long before some of them will be constrained to make their accounts with yearly increases of 5 per cent. or so in the number of lamp connections, instead of the fast growth of the exploitation period through which they are now passing. Then we shall see what the industry is worth, so far as London is concerned.

Mr. Bernard Drake writes to our electrical contemporaries to suggest that the vilification of the incandescent gas-burner, in which some partisans of electric lighting have lately indulged in the presumed interest of the incandescent electric lamp, is hardly wise. It was time that some sensible electrician took notice of the way in which the true interests of his industry are being prejudiced by these ill-advised outbreaks. Mr. Drake prefers to regard the Welsbach light as an aid to the education of the public in the proper appreciation of improved lighting; and he holds, reasonably enough, that "any step in this direction is bound to prove advantageous to the electric light sooner or later." This is the correct attitude for electricians to take in regard to their most formidable rival; for, after all is said and done, the victory will be to the light which the public like best, and the result is not likely to be greatly affected by partisan advocacy or abuse. Mr. Drake admits that Welsbach burners afford more light for a given consumption of gas than was formerly considered possible. When once used, he thinks it improbable that this gas-light will be readily abandoned, and a return made to an old-fashioned burner. But he is sanguine that, after consumers have "found out for themselves the drawbacks attending the use of this form of light, they will inevitably follow the example of many others during the past five years in adopting the electric light," which Mr. Drake naturally declares to be "the illuminant most conducive to health, luxury, and convenience." Well, we shall certainly not contest the right of the public to elect which light to patronize. We fancy, however, that if the final choice had gone generally in the way indicated by Mr. Drake, other electricians would not have cried out so lustily against the Welsbach light, nor tried so desperately to blacken its character.

The latest authoritative information respecting the quality and behaviour of incandescent electric lamps is contained in a paper by Professor Ayrton and Mr. Medley recently read before the Physical Society. It is stated in the paper that, with the newer make of lamps employed in these tests, it was found that candle power, current, and candles per watt all rose as the lives of the lamps increased. The authors were naturally surprised at this result, and were careful to investigate their testing apparatus. Starting again with new lamps, they once more found that in every instance the light given out was greater after the lamps had been in use for some time than it was when they were new. In earlier tests of such lamps, a considerable falling off in candle power had always been noticed after the lamps had been running for some time. Furthermore, while the globes of the earlier lamps were always much blackened, even after a run of a few hundred hours, and so became comparatively useless long before the filament broke, the Edison-Swan lamps now tested showed hardly any blackening, even when the filaments lasted upwards of 1300 hours. The rise in candle power was always accompanied by an increase of current, which was, however, proportionately much smaller; so that the consumption of power per candle was actually less after the lamp had been running for 50 hours than it was when the lamp was quite new. The authors drew several conclusions from their tests, among which the most important are: That when a group of Edison-Swan lamps are in use together, and each lamp, as its filament breaks, is replaced by a new one, it may be expected that the total amount of lighting effect obtained will never be so small as when all the lamps are new; that an Edison lamp marked 100-8, when run at 100 volts will give an average illumination of about 10 candles, and will absorb about 4·3 watts per candle; and that, with lamps of the type examined, there is no point at which it becomes economical to discard a lamp before its filament actually breaks. Professor Ayrton explains that the improvement in these modern incandescent lamps with use has been said to be due to an improvement in the vacuum. He finds, however, that though the vacuum does improve in all lamps, the increase of candle power varies between wide limits. All this is very remarkable, and quite different from what had come to be generally accepted with regard to the effects of prolonged use upon incandescent electric lamps. It is good news for users of lamps; and the statements contained in the paper, although, of course, not made with any such intention on the part of the authors, will be a good advertisement for the productions of the Edison-Swan Company, and help them to retain the business which is so fiercely assailed by the competition of cheap and nasty lamps made on the Continent. It would have improved the paper if the behaviour of other lamps than those of the premier English manufacturers had been similarly described; but then the different patterns and makes would have perforce been deprived of their commercial identity by being represented by a mere letter or number, which would have been far less interesting to all parties. It amply redeems physical science from the charge of barrenness and unpracticality when it is seen so amicably allied to business interest.

RELATIVE COST OF GAS AND ELECTRIC LIGHT WORKS.

A VERY important matter was briefly touched upon in a recent issue of the *Electrician;* but the brevity of the reference took nothing from its weight. It was in the form of a short editorial statement as to the comparative initial cost of gas and electric lighting plant, such as would be required for the lighting of small towns and villages, which may be imagined as just at present contemplating the substitution of an improved system of public lighting for the obsolete oil-lamps with which many such localities have been hitherto content. Of course, this process of advancement is always going on in different parts of the country; but there is some force in the remark that the movement is specially to be noticed just now, inasmuch as the recent extension of powers of local self-government may be supposed to have aroused a number of urban districts to a better sense of what is due to themselves in the matter of public and private lighting. We have reason to know that inquiries are actually being set on foot in this regard in many places; and it cannot be denied that public lighting is no longer the "Hobson's choice" that it was a few years ago. Speaking for the gas industry, we have no reason to complain of this alteration of circumstances, for the fact of being in a position to choose between even two systems of organized lighting in itself tends to create an interest in the subject in places where none was taken. The electrical pioneer is abroad in the land to some purpose; and, whether he will or not, he cannot but take from the shoulders of the pioneers of gas lighting some of the onerous burden of persuading benighted neighbourhoods to at least consider the propriety of putting from them this reproach. For the moment a man is talked to on the subject of electric lighting, he begins to think about gas, and *vice versâ*. Hence it is of considerable moment just now to the partisans of both industries to have a firm grasp of the fundamental data on which they will have to base their claims to the consideration of the inhabitants of those new localities in which they may hope to break ground.

Our contemporary observes with point that, "quite apart from the relative merits of gas and electric light in regard to the working cost, it may come as an item of refreshing news to more than one local authority that electric light plant is far cheaper than gas to erect in the first instance. An average-sized gas-works will cost from £600 to £700 for every 1,000,000 cubic feet per annum of capacity. Taking 5 cubic feet of gas as equivalent to 12-candle power for an hour, and 60 watts as equivalent to 16-candle power, it will be found that this amount of gas is equivalent to about 9000 B.T. units. Assuming the same amount of lighting to be done by an electric supply station with an annual load-factor of only 15 per cent., it will require a plant capacity of about 6·8 kilowatts to do the work electrically. The initial cost of electric light works and mains per kilowatt depends upon the system adopted; but Mr. Crompton's estimate of £80 for the low-pressure system may regarded as being well above the average price. If we accept this basis of £80 per kilowatt, the cost of an electric light station and mains, equivalent to a gas-works giving 1,000,000 cubic feet of gas per annum, works out to only £534—a figure which compares very favourably with the £600 or £700 for gas-works." We give the statement in full, word for word, in order to avoid the suspicion of tampering with our contemporary's figures and conclusion, and also to give our respected opponent's case every advantage in our power in the way of publicity. Indeed, we are extremely glad to have the opportunity of acquainting our readers with the best that electricians interested in the lighting branch of their industry can say for it with any regard for truth and soberness.

Let us now take the figures for what they are worth, beginning with the capital cost of gas-works, which our contemporary puts at from £600 to £700 per million cubic feet of annual output. Mr. V. Wyatt told the North of England gas managers in 1887 and 1888 that large-sized gas-works could be built and equipped at a cost of something like £354 per million; and he allowed that smaller works would cost more, until he arrived at a cost of £500 per million for works capable of an output of a million cubic feet per day. These would, of course, be far beyond the scale of works contemplated in the present connection. Mr. Chester, of Nottingham, also speaking of large works, thought in 1892 they ought to be built for about £464 per million cubic feet of annual output. The figures chosen by our contemporary are those given in Newbigging's "Handbook" (see the Fifth Edition, p. 417), and probably apply fairly well to the class of undertakings now in question. We, at any rate, accept them as trustworthy in a general way. It is one thing, however, to compute a ratio of capital outlay for a completed gas-works, and quite another thing to apply such a figure properly for comparison with a similar figure relating to a totally different kind of works, producing not gas, but something else.

Looking at the matter in this light, we do not hesitate to declare that the relative value which our contemporary would ascribe to the figures cited as representing the cost of establishing gas and electric lighting undertakings for small towns and villages, is wholly misleading and imaginary; and we shall very quickly and easily make it appear why this is so. In the first place, there is the consideration of the respective periods during which the capital accounts of gas and electric works remain open for purposes other than providing for the growth of business beyond the limits originally contemplated. If it is granted that the figures representing the bare cost of an electric lighting undertaking are rather less than those referring to a gas-works of equal producing power (which we do not grant without reserve, our respect for Mr. Crompton notwithstanding), the question still remains, What has the purchaser got for his money in each case? In the case of the gas-works, he has, to begin with, a considerable piece of land, a number of substantial buildings, a set of heavy, durable plant capable of doing at a pinch much more than the rated amount of work, and a network of distributing plant which will last for an age. In the case of an electric lighting plant, he will have a small factory building, an expensive set of machinery, perishable, temporary, and just capable of answering its estimated purpose, and distributing plant in no respect equal, either in the structural sense or in revenue-earning capacity, to gas-mains costing the same amount of money.

Again, the investor in gas plant has something that is capable of earning him money in various ways. He can sell light, heat, power, and several useful bye-products. His agents are able to enter upon their books both the rich and the poor consumer; and, broadly speaking, their clients are the whole town. The purchaser of an electric lighting plant, on the contrary, has to make his account with a small minority of townspeople by way of patrons, and is compelled to charge a high price for his commodity. He can only sell light; for what he can expect to do in a country place in the way of supplying heat and power is not worth talking about. And by the time a new gas-works would be filling out nicely to the intentions of its designer, at the cost of a few new fire-bricks, half the electrical plant that had cost the same money would need to be renewed.

It is, in point of fact, idle to discuss the mere initial structural value of any industrial establishment, whatever its purpose, without regard for the working expenses and profit-earning capacity of the thing as a going concern. If it were a question of the construction of a working model to be kept in a glass case in a museum, then our contemporary's way of treating the subject would be worthy of some respect; but as it refers to a matter of business, the suggestion is to be taken for its ingenuity, which we admit to be considerable. It is just the sort of thing that electrical touts like to get hold of; and the fact of its being put into circulation by a high-class technical periodical is the kind of credential these gentry prefer. Our contemporary, of course, is only responsible for the statements, not for the use that may be made of them to the undoing of incautious local authorities; but it is a pity that currency should ever be given to a specimen of the half-truth which is always so much more mischievous than a downright lie.

And now, having had our say respecting the guileless attempt of the *Electrician* to put small townspeople upon a wrong scent in their praiseworthy hunt for an improved system of lighting, we have a remark to make for the guidance of those who would like to see the benefits of gas lighting extended to regions as yet deprived of its conveniences. The new rural or urban district gas undertakings of to-day must be organized differently from those of a decade or so ago, if they are to be successful. To begin with, there is no reason why small country places should deliver themselves up into the hands of the company promoter, who always makes them pay dearly for the accommodation in the way of excessive capitalization which he obtains for them. Why should electric light speculators alone have the ear of local authorities? If these would be wise, and set themselves to put down gas-works of their own, under competent professional advice, the work could usually be done at a considerable reduction on Mr. Newbigging's estimate, and the undertaking would make its natural growth in very much less time. It has never been shown at what price a local authority, starting unhampered in any way, could supply a new district with gas. Nothing that Mr. Wyatt remarked to the North of England Association in 1887 on the subject of "loaded" and "watered" gas stocks was too strong. In many cases, a gas undertaking is made by company-promoters into a permanent curse on its district before the inhabitants have the chance of helping themselves in the matter.

Moreover, when we talk about introducing gas into a new neighbourhood—new, that is, to the system of lighting—we ought nowadays to act up to the full meaning of the term. It is not enough to make the gas, and put the mains where the consumers can reach them if they chose. All experience shows that in such a case many householders will go to their graves in ignorance of the possibilities of the new light and fuel that passes their doors. By the aid of prepayment meters and gratis gas fittings and stoves, a modern gas undertaking can be made to start with all its work cut out for it; and the gas engineer who failed to make arrangements in this regard would be unfit to have the privilege of endowing a town with gas. Many other considerations connected with the same line of argument for gas might be advanced; but enough has been said for the present to show that local authorities will do well to think of gas when contemplating the improvement of the lighting of their districts, and not be led away by the advocates of a rival system who would restrict their attention to one or two aspects of the question. And it will be matter for surprise if the prepayment meter does not, in proper hands, approve itself as valuable an aid to starting a new gas undertaking in an old locality as it already has been in relation to the modern expansion of old undertakings, which is so striking a feature of the times.

NOTES.

The Impurities in London Snow.

Mr. John B. Coppock, Science Master of the Camberwell Institute, has published in the *Chemical News* a report upon the action of snow as an atmospheric scrubbing material. Dealing with the snowfall of the 13th of January, which had an approximate depth in London of 4 inches, Mr. Coppock remarks that one characteristic of this snow was its great porosity, and the regularity of its crystals; both indicating that it was formed in a calm atmosphere. The snow was melted and then analyzed as water, when the impurities were found to be as follows, stated in grains per gallon: Total solids, 10·65; mineral matter, 5·75; carbonaceous matter, 4·90; free ammonia, 3·20; albuminoid ammonia, 4·62; oxygen to oxidize, 0·721. A further analysis was made of snow from the same suburban district after the fall on the 30th of January. The result was almost identical with the above figures; but the fact was established that the earliest strata of snow contained the largest amount of impurities. Fifty per cent. of the snow's thickness contained 75 per cent. of its impurities. An analysis of the snow of Jan. 30 last was also made from a sample collected in the quadrangle of Somerset House. The physical condition of this fall was favourable to its picking up much suspended matter. The following are the figures: Total solids, 17·32; mineral matter, 6·25; carbonaceous matter, 11·07; free ammonia, 4·65; albuminoid ammonia, 6·50; oxygen to oxidize, 1·16. The carbonaceous matter in each sample was ordinary soot particles. The difference between the two sets of figures illustrates the difference between the condition of the atmosphere of Central London and the suburbs. The analyses also go to show the manurial value of snow, and its beneficial effect upon the air of smoky towns.

The Cementitious Value of Lime.

A correspondent of *Engineering*, writing not as a man of technical experience, but as an amateur of building, raises an interesting question respecting the cementitious value of what he calls pure lime. He states that nearly two years ago he had two half-bricks put together with pure cement, and a similar pair at the same time put together with air-slaked lime, as he happened to have a load of lime which had been lying in an outhouse for many months, until it had become air-slaked. Both pairs of half-bricks are still reported to be adhering strongly together. This result in the case of cemented bricks is, of course, only normal; but it is observed that while the cement is probably the stronger of the two methods of jointing, the lime-joint is still very strong. The joint is about $\frac{1}{8}$ inch thick; and the lime was made into a very thin mortar and immediately put between the two bricks, where it set firmly in three or four days. But it has hardened by time. The correspondent asks if anyone has ever tried pure lime in very thin joints as a cement for bricks, put on immediately after it has been mixed with water. In the case under notice, as the lime was of Welsh origin, it was probably, although described as "pure," of a more or less hydraulic nature. The use of a pure white lime as a jointing material for pipes in certain circumstances is well known in gas-works; but lime without sand could hardly be used in ordinary building, whatever its cementitious value, as it would be unable to support the superincumbent weight. At the beginning, at any rate, the office of sand in lime mortar is wholly mechanical.

Straightening a Leaning Chimney.

An instructive paper was read by Mr. J. C. Platt at the recent meeting of the American Society of Mechanical Engineers, upon a method adopted in the risky process of straightening a leaning chimney-stack 100 feet high and about 28 inches out of plumb. The chimney is rectangular in plan, brick built, 9 ft. 6 in. square at the bottom and 5 ft. 4 in. square at the top, with a 3 feet flue. It stands upon a foundation 14 feet deep, consisting first of a bed of concrete 4 feet thick and about 14 feet square, on which rests heavy stonework tapering from the area of the concrete to that of the brick at the ground level. The weight of the brick-work is estimated at 206 tons, and of the foundations 149 tons; making a total load of 355 tons, resting on 196 square feet, or about 1·8 tons per square foot. The first operation for the straightening was to erect a scaffold about the stack, for the purpose of placing in position eight oak timbers, 6 inch by 10 inch by 10 feet, vertically at the corners at a height of 42 feet above the stonework, and 4½ feet below the centre of gravity of the brickwork. The object of these timbers was to spread the bearing of the wire-rope guys to be used in pulling the stalk straight. Wire ropes were wound round the timbers, and one end of a 2½-inch wire rope was secured to this system, and laid out to a point 78 feet distant, in the line of the intended pull. Its ground end was here connected to a system of pulleys. Side guys at right angles were also put out from the chimney. The next stage was to excavate the earth on the high side of the foundation to the bottom of the foundation, and nearly half way round the mass. The main cable was then put under strain by means of the pulleys; and in the course of three weeks the chimney was brought back about 4 inches. Then with a post-hole digger 8 inches in diameter, eleven holes were sunk vertically in the bottom of the trench round the foundation, principally at the highest point, until a depth of 5½ to 6 feet had been reached. The effect of this removal of the earth was that the chimney righted within a few hours by another 5 inches, which increased to 8 inches by the next morning. The slack of the haul-rope was taken up as fast as the chimney moved, so as to keep it under strain. By tightening the rope two or three times daily, the chimney was ultimately brought to the vertical; the rate of movement being about ¼ inch per day. The operation appears to have been completely successful; but it remains, of course, to be seen whether the cure is permanent.

Gas Power Propulsion for Barges.

Messrs. Matter and Co., of Rouen, have constructed an interesting application of the "Simplex" gas motor of Messrs. Delamare-Debouteville and Malandin to river barge propulsion. The barge was the first of an intended line to serve on the Seine between Havre and Paris; carrying 250 tons of cargo. The idea was adopted of making these barges self-propelling, by means of engines driven by compressed gas, upon a plan recently illustrated in *Industries and Iron*. The motor is of the vertical two-cylinder type, developing 40 effective horse power. The store of gas, which is obtained from a small works situated on the Seine midway between Havre and Paris, and of the ordinary illuminating description, is carried in steel tubes under a pressure of about 220 lbs. per square centimetre. The barge carries 80 tubes, each weighing 715 lbs., and holding 22 cubic metres of gas. The dead-weight of the tubes is therefore a serious consideration in this system of propulsion; although, both in weight and space occupied, they compare favourably with boilers and bunkers. The battery of tubes is carried on the captain's bridge, from which the gas is led through expanding apparatus to the engines. Should there be any leakage, therefore, it will be directly into the open air. In order to work the gas-engines to the best advantage, they are arranged to be kept in regular movement in one direction; the necessary manœuvring of the barge being effected by means of a M'Glasson two-bladed reversible screw propeller. This appliance permits of any alteration of speed or direction being made by changing the set and pitch of the screw blades, which can be done directly from the bridge. The performance of the barge appears to be satisfactory; and it is considered that gas-engines used in this way have a future before them for small ship and barge propulsion, as for many reasons they compare favourably with steam power for these small and slow craft.

TECHNICAL RECORD.

MIDLAND ASSOCIATION OF GAS MANAGERS.

The Eighteenth Annual Meeting of this Association was held on Thursday last, at the Grand Hotel, Birmingham, under the presidency of Mr. GEORGE WINSTANLEY (Coventry). There was a numerous attendance of members.

MINUTES OF LAST MEETING.

The HON. SECRETARY (Mr. C. Meiklejohn, of Rugby) read the minutes of the last meeting, which were confirmed.

ELECTION OF NEW MEMBERS.

The following gentlemen were next elected members of the Association: Mr. E. M. Beecham, of Cirencester; Mr. G. A. Collins, of Dudley; and Mr. J. Fryer, of Market Harborough.

ASSOCIATION REPORTS.

The PRESIDENT announced that the Committee had resolved to recommend that the bound volumes of "District Association Reports" should be distributed among the members. He moved that the recommendation be adopted.

Mr. J. T. LEWIS (Wellingborough) seconded the motion; and it was unanimously carried.

ANNUAL REPORT OF THE COMMITTEE.

The annual report of the Committee, which had been distributed among the members, was then presented; and, on the proposition of the PRESIDENT, seconded by Mr. R. O. PATERSON (Cheltenham), it was adopted. The report read as follows:—

The annual meeting of the members of the Association was held in the Board-Room of the Stourbridge Improvement Commissioners, on Thursday, Feb. 15. The members were received and welcomed to Stourbridge by Mr. Collis, the Chairman of the Commissioners, Mr. Jones, the Chairman of the Gas Committee, and Mr. North, the Engineer of the gas-works. The President, Mr. R. O. Paterson, of Cheltenham, delivered the presidential address, which was both instructive and suggestive, and was listened to with keen attention and hearty appreciation. After the formal business of the meeting was disposed of, the members adjourned to the gas-works to join in the inauguration of the new (Gadd and Mason) gasholder, erected for the Commissioners by Messrs. R. and J. Dempster, of Manchester, and to inspect the works, which had but recently been entirely remodelled by Mr. North. After this, the members visited the engineering works of Messrs. Jones and Attwood; and a very interesting and enjoyable meeting was brought to a close by a dinner at the Talbot Hotel, to which the members were invited by Mr. Jones and Mr. North.

The spring meeting was held at Cheltenham, on May 31. The members were received on arrival at the station by Mr. Paterson, the President, and driven first to his house, where light refreshments were provided, and subsequently to the gas-works, where a short formal meeting was held to read the minutes, and elect new members. The

inspection in detail of the gas-works was then undertaken, under the guidance of the President; and as in many respects the Cheltenham works are unique, the opportunity to closely examine them was very much appreciated. Carriages were in waiting to drive the members to the handsome town offices of the Company, and on through lovely scenery, over the Cotswold Hills, to the hamlet of Birdlip, where dinner was provided by the Directors of the Gas Company. Mr. Skillicorne, the son of the late Chairman of the Gas Company, presided; and after ample justice had been done to the good things provided, the return journey was made by a different route, thus adding to the enjoyment of the lovely drive. The members very heartily appreciated the generous hospitality of the Directors and the President.

The autumn meeting was held on Thursday, Oct. 25, at the Grand Hotel, Birmingham. The following officers were elected for 1895:—

President . . . Mr. Geo. Winstanley, Coventry.
Vice-President . Mr. W. R. Cooper, Banbury.
Hon. Treasurer . Mr. Peter Simpson, 65, Hillmorton Road, Rugby.
Hon. Secretary . Mr. C. Meiklejohn, Rugby.
Committee—Messrs. J. Brooks (Derby) and J. Young (Etruria) were elected in place of retiring members.
Auditors—Messrs. W. Parlby (Hereford) and S. Meunier (Stockport).

Two valuable papers were submitted to this meeting—the first by Mr. W. Belton, of Shrewsbury, on "A Sketch of a Process affecting Gas Purification and Sulphate Producing;" and the second by Mr. J. T. Lewis, of Wellingborough, entitled "The Use of Charging and Drawing Machinery in Small and Medium-Sized Gas-Works." The chief object of the process described by Mr. Belton was to get rid of the large volume of spent liquor ordinarily occurring in sulphate manufacture; and in accomplishing this, by adding alkali to the water run through the scrubbers and also to the stills of the sulphate plant (instead of lime), it was found that there was an increase in the quantity of sulphate produced, and a decrease in the amount of impurities carried forward to the purifiers. Mr. Davis, of Manchester, kindly attended and gave additional information on the chemical reactions involved in the process. A good discussion followed the reading of the papers; and a very interesting meeting was brought to a close. The members then had "high tea" together.

The Committee regret to have to announce the loss of one member by death—Mr. G. E. Ledger, of Tewkesbury. Ten new members have joined during the year. The balance in hand (as per statement of accounts) shows an increase of £7 5s., being now £79 6s.

The Committee again desire to solicit the interest of the members in contributing to the technical work of the Association.

On behalf of the Committee,
Geo. Winstanley, *President.*
C. Meiklejohn, *Hon. Secretary.*

INAUGURAL ADDRESS.

[The President, before reading his Inaugural Address, asked for the kind indulgence of the members, as he had been suffering from a bad attack of influenza; and this was the first time he had been out since.]

Gentlemen,—Before entering into the general routine of an address, I wish you to accept my thanks for the honour conferred in electing me President of this Association. I must confess the position was accepted after much hesitation and misgiving as to competency to fulfil the duties the position calls for. However, I trust the well-being and progress of our Association will not suffer during the period I hold office; and I sincerely hope that all members will assist in furthering the object for which such Associations are formed, by giving their experience, let it be failure or success, met with in the course of searching after knowledge. I feel sure we have many members who could give much information of value, and who have doubtless cultivated that necessary habit of observation; thereby storing up a fund of knowledge which proves so useful in our everyday life and business. It is said, "A man should keep his little brain attic stocked with all the furniture that he is likely to use, as the rest can be put away in the lumber-room of his library, where he can get it as he wants it;" and I have no doubt many here have followed this advice. Let me, therefore, ask that they give to us some portion of their harvest.

It is very difficult to put together matter entirely free from the general run of information given in the numerous past presidential addresses, and in the periodicals specially circulated for our benefit. It would be a delicious reward if one could show genuine originality in an address of this kind. I have felt what Roman theologians call "an invincible ignorance" with regard to what is expected from me. I might draw comparisons between the different available methods of gas enrichment; or have thought it desirable to bring before your notice the rapid strides which electric lighting has made during the past few years, and its bearing upon our industry; the extensive use of the method of incandescent gas lighting, both for public as well as private use; the progress of water gas; miners' troubles; prices of coal, and its effect upon the various industries, not forgetting our own; and the thousand and one things connected with our profession. But all seem to have been so detailed by the press, that it would seem superfluous on my part to review these matters. Thomas Carlyle writes thus: "A man is at all times entitled, or even called upon by occasion, to speak and write, and in all fit way utter what he has himself gone through and known, and got the mastery of; and in truth, at bottom there is nothing else that any man has a right to write of. For the rest, one principle, I think, in whatever further you write, may be enough to guide you—that of standing rigorously by the fact, however naked it look. Fact is eternal; all fiction is very transitory in comparison. All men are interested in any man, if he will speak the facts of his life for them, his authentic experience, &c." Following this exceedingly wise advice, I purpose to give a short description of the growth of the undertaking under my charge, interspersing remarks on the various kinds of plant in use.

If we look back to the years stretching right away to the early beginning of the century, we find the pioneers of the gas industry struggling along with various forms of apparatus used in the manufacture of gas. They possibly little thought that the general forms of plant used by them would be so slightly changed after the lapse of 90 years. This speaks well for their foresight; for is it not a fact that in our undertakings we see very little change in the outward signs of manufacture? It is said that progress is not always improvement; but it may bear rich fruit in due season. Meanwhile, any new school is better than the eternal imitation of the old. Surely there are young minds enough to form new conclusions, and to outgrow old ones.

It was ever the desire of my predecessors to be in the front rank of progress. Hence from the time of the formation of the Company in 1820-21 down to the present, betterment (if I may so use the term) has been the general order—not in respect to beauty in structural work, but in all things appertaining to the improvement in the manufacture of the commodity we have to sell. In the early existence of the works, gas was sold by contract at a fixed price per burner per quarter, and so on. We have no official records showing the progress of the works until 1852. From that year onwards, we get reliable data and registration conducted properly. In the year 1852, the make of gas was 33¾ millions; then we find that the make doubled itself in each succeeding ten years, excepting the ten years ending 1882. For the year ending March 25, 1895, there are signs of our make being upwards of 350 millions.

Before entering on a description of the general indoor plant, it will be well to point out the great necessity for close and regular inspection of consumers' meters, not forgetting mains and services. Our experience, extending over very many years, proves that there accrues a considerable revenue from constant inspection. The unaccounted-for gas reaches with us as low as 1·78 per cent.; the average for the past four years being 2·42 per cent. At first sight, the cost of such inspection would seem to weigh heavily against its introduction; but the after-fruit is rich, and well repays the cost. I fear, however, the penny-wise and pound-foolish idea prevails in many minds, and thus prevents the cost being incurred. If however the system as carried out by ourselves were adopted, the person employed would inspect the stoves, and see that everything is in due order and satisfactory. The meter would be tested in position, to see if it registered the consumption of a 5-feet burner. Frequently, it is found that registration will not begin until three 5-feet burners are going. But if there is no movement with the first burner, the meter is brought home, and another takes its place.

It would be very difficult (even if agreeable to you) to give an account of all the changes which have taken place during the period intervening between the years 1852 and 1894; and I do not think very much of the information would be of service. Suffice it to say that we have had bad times, when it became necessary to try all means of reducing expenditure—introducing any appliance which would assist in attaining this end. Improvements in carbonization grew fast; alterations were made in the existing style of settings (known as Croll's), which had an upper stage and fire on one side heating seven clay retorts, and return fire heating five iron retorts on the lower side. This arrangement was altered, and settings of nines substituted, containing six retorts, 26 inch by 15 inch, and three 18 inch by 15 inch, heated with a fire on the lower side. This was a decided improvement; but here commenced a trouble with stopped pipes. Water jackets on the rising pipes, and many other arrangements were used, resulting only in partial success; and our attention turned in another direction—to an alteration of the hydraulics. We carefully adjusted them to give a regular and constant seal on the dip-pipe, and altered the position of the rising pipes and tar take-off. Then we arrived at comparative comfort. Therefore, out of this experience, we learn the necessity for every dip having a seal uniform, and not too deep (about ½ inch), so that the tar should flow easily and quickly. Also that the hydraulic should be free from impediment, and have proper flushing arrangements—the operation of flushing with ammoniacal liquor being daily performed. Further, that every rising pipe should be augered out each time of withdrawing the charge, and that the instrument should be nearly the size of the internal measurement of the pipe, and not a piece of 1-inch pipe. There have been various ideas and fads introduced to prevent stopped pipes. Let proper attention be paid to adjustments, &c., as herein stated; and I think my friends will be as free from the trouble as ourselves, although we have such high all-round heats. All our new hydraulics are arranged without external dip and bridge pipes; and whilst maintaining the seal, to ensure the non-pulling of deleterious gases, we reduce the weight of iron per mouthpiece by about 4 cwt., and arrive at a most important point—viz., reducing the travel of the gas between the retort and take-off main, and also the total cost of construction.

The reclamation of waste heat attracted my attention as far back as the year 1866, and has been followed on to the present

time—first, by adopting ordinary pipes in the main flue running underground, and thus conveying air over the arches of ordinary settings; thence under the main flue and down walls, finishing under the flues of the settings; and finally behind a specially made furnace-lining; then opening out over the top of the coke—meeting in all these trials with success of a partial kind, and reducing the fuel 4 to 5 per cent. The system of using a large generator to supply a number of settings also was tried many years ago. The result with this, as in all other "rob Peter to pay Paul" arrangements. It demonstrated to us the fact that they are not worth the bricks they are built with. There is constant inequality and irregular division of the gases, and the consequent fluctuation of the heating of the retorts. There is no genuine mixture of air and carbonic oxide. You may look into all such structures, and fail to find the heat you would expect, which is obtained in every rightly constructed regenerative system; and, again, the amount of fuel used is very little lower in weight than that which is used in a good furnace working an ordinary setting.

About 1876, a generator furnace was designed to hold a depth of about 5 feet of coke, with a regenerator formed of brick, having air and fire chambers of brick standing out in alternate courses on the hit-and-miss principle, for the purpose of conveying heat into the air-chambers. With this system, success was again increased as far as reduction of coke was concerned, using from 14 to 15 per cent. of fuel. We failed in this, as I presume all brick constructed regenerators must fail, not from want of careful building, but from want of soundness caused by expansion and contraction in getting up and letting down. The life of such erections cannot be long. Soon air goes the wrong way, and combustion is taking place in the wrong position. If you look at the fact that the pull is always three to four times stronger on the fire-chambers than on the air, it is easy to see what great harm a little leakage of the latter will do. I have never seen a regenerator built of brick or ordinary tiles, that has been really sound, or continued sound, after working two or three years.

After several years' trial, owing to failure to secure soundness, the present arrangement was designed and put to work under fourteen retorts, 26 inch by 15 inch in section, each carbonizing over one ton per mouthpiece per day, with a fuel percentage of under 12 lbs. per 100 lbs. of coal carbonized. This was thought good; and it persuaded us it was not sound policy to adopt half measures costing much, with no compensating return for the outlay. We have now settings carbonizing 10 tons of coal a day, with 8 lbs. of coke per 100 lbs. of coal carbonized, without clinkering for eight or nine weeks, or even longer. The question may be asked, What does all this point to? It points to this: We have been enabled, by the saving effected, to repay all the cost of the alteration in less than fifteen months; our carbonizing power has been more than doubled on the same area; and we get a reserve of power which the ordinary system of firing will not give, because with the regenerative system the duration of the charge may be made three, four, five, six, or any number of hours. The life of the retorts is certainly longer—or rather, I would put it thus, the tonnage carbonized is nearly double during the life of the retort fired on the regenerator than on the old system; and, again, there is saving to the workmen, as the clinkering and attention to fires is not so laborious as of old.

After years of experience in which success was not gained without meeting with failures (by the word "failure" I mean, of course, that we failed to attain the point which we anticipated), the gradual progress in improved working and increase in the amount of fuel saved, gave an incitement to further the good work. After working the present system for eleven years, we have no reason to regret its introduction. The saving has been enormous—amounting to between £2000 and £3000 per annum. The results obtained, in all ways, speak for themselves. These regenerators have a life of ten years, and have been in almost constant use during the periods named. It is not always necessary to pull down arches. These can be successfully underpinned, as was done in my own case. We excavated ground, and underpinned each wall—going a depth of 9 feet to the footings; and when these settings were put to work, there was no shrinkage worth noting.

In arranging regenerative systems, much is often lost sight of. The generator should bear a certain ratio to the surfaces to be heated. This is found by experience to be so. There are fundamental principles underlying and governing the proper adjustment of the parts forming an important element in the efficient working of such systems. For instance, the production of carbonic oxide should be, in volume, only sufficient to do its work. An excess means that you gain very little good from all the expenditure entailed in erection; or I should say not the value which you ought to receive. The volume of carbonic oxide should be in proportion to the requirements, and not in excess—any excess is at the expenditure of fuel. When the true proportions are arrived at, no combustion chamber is at all necessary. The air should be of a temperature sufficient to form combustion the moment it comes in contact with the carbonic oxide from the furnace.

We are told by some advisers on regenerative firing that the system is performing proper work when flame is seen playing about the setting. Now, if working truly, and under proper conditions, there should not be seen a particle of flame. In fact, the arrangements should be so perfect that, the moment the two bodies meet, combustion takes place. The heat should be of such a nature that it is almost impossible to look at it with the naked eye.

There are types of so-called regenerators which work utterly at variance with the known laws of fuel combustion and heat. I have rather elaborated the subject of regeneration; and my reasons for so doing are that the advantages to be gained from its use are so great that I have thought it advisable to lay stress upon the good work which undoubtedly follows its adoption. I would strongly advise that no half-measures should be taken, but that in all contemplated erections of this kind, let them be regenerative pure and simple, always assuming that the ground will allow. Very often good has been attributed to the erection of systems which in great measure would be obtained by reconstruction of obsolete patterns of settings and apparatus.

The foregoing leads me to speak of the system of inclined retorts erected at Coventry. In my paper read before the Incorporated Institution of Gas Engineers in May, 1893, particulars of cost of erection and working may be found. That with us the installation has been a success, there is not the shadow of a doubt. It has worked successfully up to the present time. This apparently wonderful phenomenon has produced critics in plenty; but perhaps this is not the occasion to classify and analyze them. The principal advantages we gain by its adoption are threefold: First, saving of space (and this is very limited with us); secondly (and the most important), the employment of a class of labour hitherto not capable of undertaking stoking as performed on the old lines; and, thirdly, that although the structural conditions of our retort-houses would not permit us to use stoking machinery as applied to horizontal settings, the same elevating, conveying, and storing plant is used in both cases.

There is much to be done towards simplifying the machinery connected with the charging arrangements. That a corruption of the best things produces the worst, is a maxim well established. We see proof of this in the various superfluous arrangements brought forward in order (we are told) to more easily regulate charging, and to give an all-round check upon coals used, which merely increase the cost of erection. We find the first simple charging arrangement to be all that one would desire. The two systems as adopted at Coventry—viz., horizontal and inclined settings—give a carbonizing power of 300 tons of coal a day; the present requirements being 210 tons a day. This leaves a good margin for further increase, and will at once show that further extensions on this head are not yet wanted.

The foul gas is conveyed through a long length of 18-inch main, and an 18-inch pipe condenser; finishing through two of Morris and Cutler's water condensers. The exhausting machinery is of the reciprocating type. Two tower scrubbers perform the work of scrubbing and washing. Forty gallons of 10-oz. liquor per ton of coal are obtained; and we know nothing of naphthalene. The purifying plant is rather extensive, consisting of eleven purifiers. Six are 25 ft. by 30 ft. by 6 ft. deep. They are the first through which the gas passes, and contain lime. Three are 40 ft. by 30 ft. by 6 ft. deep, containing oxide; and one is 40 ft. by 40 ft. by 6 ft., also containing oxide, and used as a catch-box. All these were put down in order to make the gas as pure as possible, on account of the delicate nature of the various goods manufactured in Coventry, and to fulfil the promises given to the city authorities. These large purifiers replaced smaller ones, and have been erected since the purchase of the undertaking by the Corporation. They are larger in proportion to the gas made than is usual. To overcome difficulties caused by want of space, a stage house had to be constructed. We have a house 180 feet long and 42 feet wide, with six purifiers, joined together, erected on a superstructure of girders and rolled joists, with a ground floor for lime. The foul lime is discharged through openings in the purifier bottom; and the fresh material is lifted by friction hoists. The process of discharging and refilling is performed by ten men in about 13 hours. Here I would say that, owing to close proximity to good residential property, in order to prevent nuisance, the foul lime in each purifier, before discharging, is treated to the indrawing of air for some hours. This air, charged with sulphuretted hydrogen, is passed into an open oxide purifier; and thus unpleasant odours are prevented.

All who have had to deal with the elimination of sulphur compounds, know the amount of care and watchfulness necessary to keep the purifiers in order. For some time, we worked four purifiers for carbonic acid, and two as sulphide; and very erratic were the results. Often, although in the middle of the second purifier from the sulphide the lime water test would not turn in 30 minutes, yet, from the condition of the gas at the outlet of the sulphide purifiers, we knew carbonic acid must be going forward (of course, the test-pipes were always cleaned well before using). Last summer, the whole system was altered; the connections being so arranged as to enable us to work the six purifiers in circuit, or two as sulphides. For the past five months, the altered system has been in work; and the results obtained are far and away better than the former plan gave, and less costly. While on the question of purification, the experience of others as well as our own, teaches the advisability of putting purifiers under cover. In the latter case, varying air temperatures do not attack them, and cause shrinking of the material; while those stationed in the open air are subject to every change, and cause much annoyance by the passage of foul gas up the sides of the purifiers.

Further, under the head of purification, it may interest you to know that we have had in use Hills's liquor process of purification, such as is used and recommended by Mr. George Livesey. The well-known washers (the invention of the latter gentleman) were used in this process. The ammoniacal liquor in passing through a boiler is heated to about 180° to 190°; and at this temperature nearly all the carbonic acid, and the greater portion of the sulphuretted hydrogen, is driven off. The liquor is then passed through coolers, and reduced to about 58° to 60°; and then into the washers through which the gas is passing. This mode of purification was undoubtedly successful; it left little for the purifiers to do. Its use was discontinued principally on account of loss of free ammonia, and the nuisance when burning the vapours given off from the liquor.

Many years ago, we manufactured liquor ammonia; but we discontinued doing so owing to the price ruling low. We now make sulphate only. In this process, the waste vapours are passed into the foul-gas main, and receive the same treatment as the gas. By these means, we rid ourselves of the nuisance and annoyance which constantly occurred when using oxide purifiers, or the specially designed furnaces erected for burning the vapours after cooling. Constant complaints were made by gentlemen living long distances away from the works, owing to the passage of the vapours from the fire into a chimney 185 feet high, and thence over the hills. For years, we have been free from these complaints.

Owing to the contour of the site upon which our plant is erected, we have three different levels; the middle one being 18 feet above the lower one, and the upper one 9 feet above the middle one. These different levels adapt themselves to part of our work exceedingly well. Something like 60,000 tons of material is carted in and out of our works annually. The coal is carted from a siding a quarter of a mile away, to shoots fixed on the high level, and shot into waggons. A tramway is laid on the second level, and continued on a viaduct into the upper timbers of shed roofs. Upon this, the coals are conveyed from the tip into any part of the sheds, and trimmed as desired. By substituting this arrangement for the old one of carting direct into the works, a saving of 6d. per ton was effected.

The area of the works will at once show how very crippled we are; the total, all told, is only about 4 acres. The manufacturing area is not quite 2½ acres; and upon this is erected all plant coming under this head, which ought to cover twice the amount of ground. The gasholder capacity is 1,900,000 cubic feet. The capacity of the works has been more than doubled since they became the property of the Corporation in 1884 (when it was 165 millions); while the capital expenditure has been £24,555. Further sums have been placed to reserve and sinking funds, and handed over to the general district rate—amounting, together with interest on bonds and annuities, to £114,963.

All appliances for the consumption of gas have been well placed before our citizens—cooking and heating stoves, engines, &c. The gas that is consumed for cooking and heating amounts to about one-fifteenth part of the gas made. The price of gas has been reduced from time to time; and it now stands at 2s. 4d. to 2s. 7d. per 1000 cubic feet. The average price is about 2s. 5½d. The illuminating power is maintained at 17½ standard candles; and the sulphur averages 8 grains for the twelve months.

This address will, in your minds, seem more fit to be called a paper or lecture, and perhaps goes wide of its mark. At the same time, I trust this punishment inflicted upon me as an outcome of my accepting office, has in its form met with your approval. I have endeavoured to place before you facts which have occurred during my 38 years' experience at Coventry. Through the passing years, old things have given way to new; applied science has increased the better treatment of gas during its course from the retort to the gasholder. The whole question of structural work, applied mechanics, &c., has been ably treated and put into practice by most eminent scientists and engineers; and we are thankful for the many benefits thus conferred upon us.

It only remains for me, gentlemen, to thank you for the indulgence with which you have listened to me; and I hope the great sense of responsibility which alone imparts vitality to our work, may lead us to employ that force in every direction by which we may identify each individual talent. There is room and to spare for each of our members to show it; the opportunities are great in both large and small works, and we would like to have experiences told.

Mr. Charles Hunt (Birmingham) said he rose with very great pleasure to propose a hearty vote of thanks for the excellent address the President had delivered. They all sympathized with him in the illness from which he had recently suffered, and could realize what an effort it must have been for him to write the address under the circumstances. They were grateful to him for having made that effort, and for the very admirable matter he had put into the address. He had drawn from his own experience from first to last, and had set an example to all future Presidents in that respect. It was from the varied experiences of others that they desired to learn. They might not agree entirely with those experiences; yet they could often learn something from those who might not hold the same views as themselves.

Mr. R. O. Paterson seconded the motion, and said he desired to emphasize the remark Mr. Hunt had made—that they were obliged to the President for the address he had delivered. Although he concurred with Mr. Hunt that they did not always accept the statements made, and the conclusions come to, by others, yet they were always glad to have the experience of others laid before them. However much they might disagree with any of the statements which Mr. Winstanley had made, they accepted them in the spirit in which he had given them—that was, for the edification and improvement of the members.

The motion was carried by acclamation.

The President, in response, said he thanked the members very much for their cordial vote of thanks. He scarcely expected when he wrote the address that it would entirely meet with the approbation of everyone, or that his statements would coincide with the experience of all of them. He had gone through the greater part of England—north, east, south, and west; and he simply spoke as he found things. He only referred to regeneration as a thing to which he had devoted a great deal of time. It seemed to him that the considerable amount of heat that was being lost a great many years ago ought not to continue; and therefore the question of reclaiming it had been followed up by him to the present time. He fully anticipated that many of the members would disagree with a large portion of the address; but he could assure them he had merely given his experience.

The Prepayment Meter System.

An informal discussion was then raised by Mr. J. C. Belton, of Wellington, on the above subject. The remarks of those members who took part in it were chiefly directed to the question of the amount of the charge to be made beyond the ordinary price of gas, to cover the interest on the capital outlay, the cost of maintenance, collection, and other expenses; there being on this point some divergence of opinion.

The Labour Saving Plant at the Saltley Gas-Works.

In view of the arrangement which had been made (by the kind permission of the Gas Committee of the Birmingham Corporation) for the members to visit the Saltley Gas-Works, Mr. Henry Hack, the Engineer, read an interesting account of the introduction and extension of the labour-saving plant at that station. The room was surrounded by detailed diagrams of the different portions of the apparatus described.*

The President, on behalf of the Association, thanked Mr. Hack for his description of the plant the members were about to inspect, and also Mr. Belton for having raised the discussion on the prepayment meter system.

The Hon. Secretary said he desired to add a very few words in acknowledgment of their indebtedness to Mr. Hack. When he visited that gentleman with reference to this meeting, he (Mr. Meiklejohn) was in a difficult position, as he had been unsuccessful in completing his programme. Mr. Hack very readily came to his aid; but he had not anticipated the elaborate description of the labour-saving plant which they had just heard read.

Visit to the Saltley Works.

At the conclusion of the meeting, the members found conveyances waiting to take them to the Saltley Gas-Works. On arriving there, they were divided into parties, which were headed by Mr. Hack and his assistants, who courteously called attention to the interesting features of the machinery, and imparted other desired information. The huge coke-crane—the operation of which was watched with considerable interest—forms one of the most conspicuous objects on the works; and (as may be said of all the other plant connected with the automatic removal of the coke from the new retort-house) the ease with which this ponderous piece of machinery works excited no small amount of admiration. West's well-known compressed-air retort charging and drawing machines were next inspected; and the smoothness with which they were performing their work, and the small amount of labour required of the attendants, were remarked upon by the visitors. The air-compressing engines next came in for attention; and afterwards the members ventured into the vaults beneath the new retort-house, where—notwithstanding the prevailing darkness, smoke, and steam—they were able to witness the working of the plant conveying the coke falling from the retorts above to the hoppers outside, from whence it is removed by the crane before referred to. Other portions of the works were also inspected; but the special object of the visit being to see the labour-saving machinery in operation, the greater part of the time was so spent.

Before quitting the works, Mr. Hack provided refreshment for his visitors, who acknowledged his kindness in a vote of thanks, moved by Mr. W. R. Cooper, of Banbury (the Vice-President), seconded by Mr. P. Simpson, of Rugby. Mr. Hack, in reply, expressed the pleasure he had had in showing the members the machinery in operation on the works. It was, he remarked, some time since the Association had visited them; and the members would have noticed that considerable extensions had been made. The new retort-house was one; and, in regard to that, he might say they had come to the conclusion that there was no further room in it for machinery—in fact, it was fully equipped. In his opinion, it was a step in the right direction to apply machinery even if it did not show any very

* This matter will be dealt with in a subsequent number of the Journal

considerable monetary saving. Coal carbonization involved such arduous work that, if they could relieve their men by adopting machinery, it was their duty to do so.

The members then returned to the Grand Hotel, where high tea was served.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

The Twenty-fifth Annual Meeting of this Institution was held last Saturday, at the Mosley Hotel, Manchester. Owing mainly to illness, the attendance was not quite up to the average; among the absentees on that account being the President (Mr. James Braddock, of Radcliffe) and his successor, Mr. George Smedley, of Buxton. Consequently, Mr. ISAAC CARR, Assoc.M.Inst.C.E. (Widnes), who became at this meeting the Senior Vice-President, was called to the chair, the duties of which he cheerfully performed. Before, however, commencing the business, he expressed the regret which he felt at having to occupy the position under such circumstances.

CONFIRMATION OF MINUTES.

The HON. SECRETARY (Mr. S. S. Mellor, of Northwich) read the minutes of the meeting held in November last; and, on the motion of Mr. C. E. JONES (Chesterfield), seconded by Mr. HARRISON VEEVERS (Dukinfield), they were confirmed.

FRATERNAL SYMPATHY.

Mr. W. W. HUTCHINSON (Barnsley) proposed that telegrams expressing the sympathy of the members with the President and the incoming President in their illness, with wishes for their speedy recovery, should be forwarded.

Mr. JONES, in a few appropriate remarks, seconded the motion, which was agreed to.

NEW MEMBERS.

Two new members were added to the roll—viz., Mr. J. S. Naylor, of Droylsden, and Mr. R. Barrett, of Clitheroe—on the motion of the SECRETARY, seconded respectively by Mr. C. WOOD (Bradford) and Mr. JONES.

THE ANNUAL REPORT—YORKSHIRE'S CLAIMS.

The HON. SECRETARY read the following report, which, it was explained, he had written on behalf of the Committee; the President having been unable to take part in its preparation:—

The Committee, in presenting the annual report, wish to congratulate the members on the continued usefulness and prosperity of the Institution. Twelve new members have been elected during the year, one ceases membership under Rule 17, and we have lost one highly-respected and valued member by the death of the late Mr. John Hutchinson, of Barnsley. This leaves a total of 100 members on the roll of the Institution at the end of the year. If the two gentlemen proposed for election to-day are elected, this will give us a total of 102 members.

The annual meeting was held on Saturday, March 3, at the Palatine Hotel, Manchester, and was exceedingly well attended. After the election of new members and office-bearers for the year, the retiring President (Mr. W. R. Chester) installed Mr. James Braddock in the chair. A hearty vote of thanks was accorded to Mr. W. R. Chester for his valuable services during his year of office. Mr. Braddock delivered his Inaugural Address, which proved a very interesting, useful, and practical one. At the conclusion, the President was accorded a hearty vote of thanks.

The May meeting is usually of an excursion character. The Committee therefore decided to pay a visit to the Manchester Ship Canal; and for this purpose chartered a special steamer. There was an exceedingly large attendance of members and friends; and it proved a very enjoyable meeting. Before the formal business was transacted, a vote of condolence was passed to the family of the late John Hutchinson in their great bereavement.

With the permission of the Gas Committee, the August meeting was held at the Gas-Works, Huddersfield. Mr. W. R. Herring, the Engineer, gave a very interesting paper on the Huddersfield Corporation Gas-Works. The gas-works were inspected; extensive alterations and improvements being in process of construction. The electric light works and water-works were also visited by permission of the various Committees. The thanks of all present are due to the various Committees and Mr. Herring for their kindness and hospitality.

The one hundredth quarterly meeting was held at the Palatine Hotel, Manchester, at the end of November, but unfortunately was not well attended. Mr. Alfred T. Fletcher, Assoc.M.Inst.C.E., read a useful paper on "The Inclined Retorts at the Leigh Gas-Works," which elicited a good discussion. Mr. W. R. Chester (Nottingham) had prepared a paper on "The Heating of Greenhouses and Conservatories by Coal Gas." Owing to Mr. Chester's unavoidable absence, the paper was read by the Hon. Secretary; and the discussion was adjourned to the next meeting.

Mr. George Smedley (Buxton) was unanimously elected President for the ensuing year.

It has been represented by some of the Yorkshire members that at least one meeting in the year should be held in Yorkshire; and the Committee now propose that the November meeting of this year shall be at a Yorkshire centre.

The retiring members of Committee are Messrs. Bridge and Parkinson.

The reference in the report to the next November meeting being held in Yorkshire aroused a somewhat long discussion on the point.

Mr. A. SHIRES (Kidsgrove) observed that he was a Yorkshireman; but he did not know why Yorkshiremen had made the request to which allusion had been made.

Mr. HARRISON VEEVERS hoped the Committee's decision was not going to be a precedent for the November meeting being always held in Yorkshire. Out of 90 of their members, 44 resided in Lancashire, 18 in Yorkshire, 14 in Cheshire, and 14 in other parts. For the February and November meetings, he did not think there was a more suitable place than Manchester. It was the most accessible centre in the country north of the Trent. Yorkshire, he thought, should be pleased with the meetings in May and August.

The SECRETARY remarked that the proportion of Yorkshire members had been increased by eight during the past year. The Committee had been given to understand that, if one of the business meetings was held in that county, there would be a large accession of members from it. The Committee's decision only referred to the present year; they could not, of course, bind their successors.

Mr. JONES pointed out that there was a rule which gave the Committee power to vary the place and time of meeting; and this he thought covered the proposition which had been raised in their report. But he would warn the Committee against binding themselves to meet in Yorkshire or any other place.

Mr. G. E. STEVENSON (Manchester) thought the Institution ought to consider the claims of members who came from Yorkshire and Derbyshire; and for this reason: The majority of the managers of gas-works in Yorkshire who were not within reasonable distance of Manchester went to the meetings of the North British Association. He did not say they should not go to those meetings; but he did think the district of the Institution should be extended somewhat, so as to include that portion of Yorkshire which was not covered by any other Association. They had a good many District Associations now; and it was not desirable that more should be established. He therefore cordially supported the Committee.

After some further discussion, it being understood that the proposal of the Committee would not bind the Institution in future years,

Mr. SHIRES moved, and Mr. T. DUXBURY (Darwen) seconded, the adoption of the report, which was agreed to.

ELECTION OF OFFICE BEARERS.

Mr. HUTCHINSON moved that Mr. Isaac Carr be the Senior Vice-President during the ensuing year. His general conduct and ability were such that he (Mr. Hutchinson) was sure the proposition would meet with the approval of all the members.

Mr. JONES seconded the motion. He remarked that he had watched Mr. Carr's career for the past twenty years; and he had not only manifested a desire to instruct his fellow-men in the science of gas making, but he had actually struck out new ground and new lines.

The motion having been passed,

Mr. CARR, in thanking the members, assured them that he had the interests of the Institution at heart, and would do his best for it.

Mr. W. DUFF (Morecambe) moved the appointment of Mr. J. Parkinson (Brighouse) as Junior Vice-President.

Mr. HARRISON VEEVERS seconded the motion. He said he believed Mr. Parkinson was not only the Manager of the Brighouse Gas-Works, but was also the Town Clerk. Speaking as one who occupied the dual position of Gas Engineer and Borough Surveyor, he (Mr. Veevers) thought it was an advantage to have at times gentlemen as Presidents who held dual appointments, because they were in a position to throw side-lights upon the opinions and practices of gas engineers. For instance, gas managers protested against the use of steam-rollers; borough surveyors advocated their use.

The motion having been carried,

Mr. W. WHATMOUGH (Heywood) proposed, and Mr. WOOD seconded, the reappointment of Mr. Thomas Newbigging as Hon. Treasurer; and this was unanimously agreed to.

Mr. JONES referred in complimentary terms to the services of Mr. Mellor as Hon. Secretary, and moved his re-election.

Mr. W. SMITH (Hyde) seconded the motion, which was heartily supported by various members, and carried.

The HON. SECRETARY, in acknowledging the continued confidence of the members, pointed out that this was the sixth time he had been elected to this office. He was somewhat astonished to find it was so. He had thought it was a much shorter term; so that evidently it had been a pleasurable one in some respects. He must confess to one thing, that the work, with a membership of 100, was getting almost too much for one man to do; and he had a good deal of sympathy with a resolution that was brought forward, some six years ago, by Mr. Harrison Veevers, to the effect that two men should jointly undertake the work.

The next business was the election of two gentlemen to serve on the Committee for three years.

Mr. W. H. S. GENDALL (Bury) proposed, and Mr. T. DUXBURY (Middleton) seconded, the election of Mr. C. Wood; and Mr. SHIRES moved, and Mr. S. R. OGDEN (Blackburn) seconded, the election of Mr. R. Merrell (Mossley). Both nominations were carried.

The Auditors (Messrs. W. Smith and J. M'Kenzie) were also re-appointed.

INAUGURAL ADDRESS.

The CHAIRMAN said the next item on the *agenda* was the introduction of the President-Elect (Mr. George Smedley) by the retiring President; but, under circumstances which they all regretted, they would have to pass it over. It then devolved upon him to read the address prepared by Mr. Smedley:—

Gentlemen,—Having been elected to this chair by the goodwill of the members of the Institution, and not, as I feel, for my own fitness or deserts, it becomes all the more difficult for me to thank you as I should do for the honour you conferred upon me. Believe me, I feel it as a mark of esteem for an old member of our guild, more particularly as this day marks the centenary of our quarterly meetings; and, by a singular coincidence, the same number of members. Looking back over fifty years, how thankful should I then have been for the opportunities now presented to all young members of the profession; and I would urge all of them connected with it to become members of one or other of the Associations which are now within reach of them in all parts of the kingdom. I do so from the knowledge of the benefit as well as pleasure I have received from my connection with this Institution.

To me just now the number of institutions of the kind are an embarrassment, as there is no subject connected with gas management which is not, I may say, almost weekly discussed. My predecessor, as well as former ones, covered the ground so well and ably, that they have left me stranded, as it were, upon a desert island, without material. So I shall, of necessity, content myself with a few notes on the method of production at the Buxton Gas-Works, and with passing remarks, in the hope that some of our members may find a peg on which to hang a future discussion.

The buildings were laid out for an estimated make of half a million cubic feet; but only half is utilized. There are fourteen beds of five retorts, which at the time they were completed were estimated to leave four vacant beds at the maximum. Since then, in consequence of alteration in the fires, 40 retorts are doing more than the original estimate, as during this season we have produced upwards of 270,000 cubic feet in 24 hours.

Next I will venture on the subject of dips *versus* anti-dips. I belong to the latter school. I am quite aware there are some members of our Institution who have tried them, and found them wanting. I had some difficulty with the first two we tried in the old works, owing to the pitch which dried on the discs, lifted them from the valve-face, and caused a back-flow of gas into the retorts. This was obviated by adding 14 feet to the length of the ascension-pipe. Consequently, they were adopted when the present works were furnished; and we have had no trouble since. There has been an additional disc attached, so that we can isolate any one retort at will, and, if necessary, work them the same way as dips. We have not found them a certain cure for stopped pipes; but we are seldom troubled with them.

Our automatic valves were originally fitted on to a dry foul main, 10 inches in diameter; but this we found in practice to be very soon filled under the valves with thick tar or pitch to such an extent as to practically close the passage. Consequently, the 10-inch dry pipe was removed, and a 16-inch hydraulic main substituted, with a bridge across the outlet end, of such a form as to drain off the tar first, leaving the main charged with liquor only, in the same manner as if working with dip-pipes. This, with systematic flushing, has had the desired effect, as well as a further tendency to reduce the number of stopped ascension-pipes; indeed, such a thing is now an exception.

I will just add that our valves and main are quite 26 feet from the mouthpieces. The tar produced in the main is taken away at the end direct to the well; while the gas is conducted by about 35 feet of 12-inch pipe to a rectangular chamber of sheet iron, 52 feet long, 6 feet deep, and 3 ft. 6 in. wide, to allow rest for the gas in its passage to the condenser proper. The tar from this chamber is also run direct to the tar-well. The gas is conveyed through about 45 feet of 12-inch pipe. At the entrance to the condenser, we have valves arranged to pass the light oils found here either through or under the condenser. We have permanently adopted the former, as we find an increase of quite half a candle in illuminating power by so doing.

The condenser is one of Morris and Cutler's old pattern, which I prefer now to their new ones, as I think the passage of the gas more smooth and even—on the same principle that Mr. Armitage wished to take out the inside ring of his annular condensers. We have a Kirkham, Hulett, and Chandler's washer, scrubber, and four 14 feet square purifiers, 5 feet deep. We have also in use one of Hawkins's carburetting air-pumps, which I think not only gives the advantage of air for the purifiers, but adds to the illuminating power of the gas; while at the same time a jet of steam is forced with it into the purifiers.

As I was anxious in these arrangements to effect slow condensation at all seasons, I have the temperatures regularly taken at various parts of the apparatus; and I give a few examples for the year 1893:—

	Jan. 1. Deg. F.	March 5. Deg. F.	June 4. Deg. F.	Sept. 3. Deg. F.
Chamber inlet	140	137	147	147
„ outlet	94	84	92	99
Condenser inlet.	89	76	82	95
„ outlet	68	59	70	80
Purifier inlet	64	53	70	76
„ outlet	60	49	62	65
Meter	50	49	62	62
Outside the works	33	41	52	54

We have now a thermometer on the outlet from the holders; and we find that the temperature corresponds as nearly as possible with the outlet from the meter. The whole of the apparatus is under cover, as a protection from the extremes of temperature in summer and winter; and all pipes are above ground up to the outlet of the meter.

Having on more than one occasion been perplexed by finding at the end of a quarter that I had apparently accounted for more gas than the station meter had registered, we endeavoured to find a reason for it; and we had the temperature taken at the works and a mile away. The figures are as follows:—

1893.	Deg. F.		Deg. F.
Feb. 12.—Station meter.	44	Burbage	44
„ 16 „ „	47	Manchester Road	51
„ 20.—Works	39	„ „	47
June 28 „	67	„ „	58
Oct. 12 „	61	„ „	58
Nov. 27 „	50	„ „	55
„ 28 „	52	Burbage	59

This satisfies me that there is something in the theory that temperature at the consumers' meters will account for loss or gain (or what is called leakage), as well as the capacity of meters in proportion to the number of lights connected to them. I may here state that the whole of the apparatus is under one roof, and all the pipes and connections are visible, and easy of access. I have purposely omitted any mention of purification, as we expect another member will have something to say on the subject.

Again I thank you for your kindness; and, although I shall do my best, I must of necessity trust to some of the younger members, of whom we have many capable, to make my year of office pleasant and profitable.

Mr. HARRISON VEEVERS moved a vote of thanks to their absent President for his address. He looked upon the Inaugural Address as a source from which to provide materials for papers during the year. It was a sort of quarry, as he once called it, from which matters could be extracted. Here they had such questions as ascension-pipes (on which he had his own views) and the registration of meters, both station meters and consumers' meters.

Mr. JONES, in seconding the motion, observed, with reference to Mr. Veevers's last remark, that there was no doubt that the difference between consumers' meters and station meters might be taken generally at 27 per cent.

VOTES OF THANKS.

The CHAIRMAN moved a vote of thanks to the retiring President for his services in the chair during the past year. They were, he said, certainly very much indebted to Mr. Braddock for his general conduct as President throughout the year.

Mr. MELLOR seconded the motion; remarking that during the past twelve months Mr. Braddock had been exceedingly anxious that everything in connection with the meetings should be well done.

The motion was heartily agreed to.

Mr. HARRISON VEEVERS then proposed, and Mr. J. MARTIN (Ormskirk) seconded, a vote of thanks to the Committee and the officers for the work which they had accomplished during the year; and this was unanimously accorded.

THE HEATING OF GREENHOUSES BY COAL GAS.

The adjourned discussion on the paper read at the November meeting by Mr. W. R. Chester (Nottingham) was then taken. Some remarks by way of supplement to the paper were made by Mr. Chester; and the following gentlemen then contributed to the discussion: Messrs. Veevers, Jones, Hutchinson, Duxbury, Elliott, Hunter, and Carr. A report of the discussion will appear in next week's issue.

THE ABSORPTION OF THE ILLUMINATING CONSTITUENTS OF COAL GAS BY TAR.

The CHAIRMAN said the next business was to have been a paper by Mr. R. G. Shadbolt, entitled "Some Experiences in Gas Purification." That gentleman, however, was too unwell to be present, and he had not prepared the paper. As the time was early, he would suggest that there were one or two points in the President's address which they might usefully talk about, without discussing the address itself. Mr. Stevenson had been good enough to offer to say a few words by way of introducing a subject.

Mr. G. E. STEVENSON said it was rather an audacious thing for a member to suggest that he should start a discussion on the basis of the presidential address. But, under the circumstances which the Chairman had mentioned, and with the proviso that he did not intend for a moment to discuss the address, perhaps such a suggestion might be excused, considering they had some time at their disposal. He had read through the address with great interest; and he noticed that the President said: "I shall content myself with a few notes on the method of production at the Buxton Gas-Works, and with passing remarks, in the hope that some of our members may find a peg on which to hang a future discussion." He (Mr. Stevenson) supposed it was not at all likely that a discussion would be inaugurated at one of their meetings this year on the basis of the presidential address; and it was very good of Mr. Smedley to suggest points upon which they might enter upon discussion. Farther on in

he address, he did this by referring to arrangements which he had adopted at his works, but which it was not his (Mr. Stevenson's) intention to criticize. The President mentioned an arrangement he had made for introducing the gas into the condenser; and at the entrance to the condenser, he had provided valves for passing the light oils which were found there either through or under the condenser. He said: "We have permanently adopted the former, as we find an increase of quite half a candle in the illuminating power by so doing." Previously he stated that he took away the tar produced in not a hydraulic main, but a dry main, direct to the well; but he had an arrangement by which he could get the light oils into the condenser. This seemed to him (Mr. Stevenson) to start an idea for a discussion on the question of condensation and the absorption of illuminating constituents by tar and heavy oils—a subject which had often cropped up in relation to gas manufacture, and been discussed without any satisfactory solution. He did not suppose for a moment he could throw any light upon it which would lead to a satisfactory solution; but he might mention a few facts which he believed would be interesting. About two years ago, one of the retort-houses at the Rochdale Road (Manchester) Gas-Works was reconstructed—that was to say, the retort-bench was reconstructed—on what he believed to be modern principles; and the method adopted for taking the tar away from the hydraulic mains was a little novel. The mains were all separate for each bed of retorts; and at the back of the hydraulic mains was fixed a gas-receiving main, and below this a separate tar-main. Each main had a gas outlet and a tar outlet; and the bottom of the main was made not a full ∪ shape, but curved at the front and straight at the back. The lowest point was at the bottom of the main at the back; and from that point a pipe conveyed the thick tar into a syphon, from whence it was carried into the tar-main. This arrangement had worked very well. It had been found that the abstraction of the heavy tar immediately from the hydraulic main (the tar was taken off not only by the overflow, but withdrawn from the bottom of the main once a day, and the main filled up with ammoniacal liquor) had had the effect of causing the tar in bulk to contain a very small proportion of benzol and the light oils; and to that extent he believed they had proved, in the working results, that they had benefited by retaining these light oils in the gas. They had, however, had a great deal of trouble with their tar distillers in regard to this question. The principal point of the trouble had been that the heavy tar had retained a large quantity of water in connection with it. Of course, it was not desirable to sell water as tar; and there had been a good deal of agitation in Manchester gas circles in respect to this tar from the Rochdale Road works, which contained, on an average, 7 per cent. of water. The water was ammoniacal liquor held in suspension by the thick tar. He conclusively proved this, that, deducting the abnormal percentage of water from the tar, there had been nothing lost—that was to say, the ordinary production of tar had been more or less the same, on taking the water from it, and adding it to the ammoniacal liquor instead; and the results had been extremely good. The question had been simply one of the quality of the tar. As it happened, during the past year pitch had been the most valuable constituent in the tar. There had been a time when the benzol and the lighter oils had been much more valuable; but they had lately been at a low price. The tar distillers informed him not long ago that they only obtained 1 gallon of benzol from their tar, whereas they usually got 3 gallons. As a set-off, however, they had had 65 per cent. of pitch, which he (Mr. Stevenson) had told them they ought to be contented with. It seemed to him that it was quite possible to make such arrangements in taking off the gas from the retorts that they would not require to afterwards recover the light oils, or to introduce them again into contact with the gas—that was, they should be able to retain them in the gas, and not abstract them at all. He had had a long discussion with Mr. Meunier, of Stockport, who had thought of experimenting with regard to maintaining the temperature of the gas and the tar until the heavy tars should have been abstracted from the gas; and his idea was that, the tar and the gas having a temperature of about 400° as they entered the hydraulic main, if the tar could then be abstracted, the light oils would not be absorbed, but would remain in the gas. He (Mr. Stevenson) thought that the idea was really a good one; but how to do it was a most difficult question. The tar would not all deposit at a high temperature, and would not deposit quickly enough to get it away before the gas fell in temperature; and for that reason, as they all knew, many attempts had been made to artificially maintain the temperature of the gas and the tar until the latter should have been abstracted. There was the Aitken process, in which it was proposed to maintain the heat by steam. Then there was the St. John process, which was experimentally used at Rochdale. That was a process which aimed at doing too much; and it tried to recarburet the gas with the tar. The great difficulty was this—that they could not accomplish what was required by steam heat, because it was not sufficient. The temperature needed was between 300° and 400°; and this they could not get with steam. To his mind, the best thing to do was to devise means by which the tar would be mechanically abstracted from the gas at that temperature—that was, before it fell below 300°. If this were done, they would have the light oils and benzol vapours left. This was what he had been endeavouring to do; and he believed he had been successful. In his opinion, the gas consumers were the people to be considered, and not the tar distillers.

Mr. SHIRES said he should like to know where Mr. Stevenson got his 300° or 400° when he passed the vapours. One of the things he was very anxious about was this matter of benzol; and he had been going into it, as his production reached the full capacity of the works. But he found, in his case, that the temperature at the inlet of the condenser was about 140°, and at the outlet 47° to 50°. After passing the gas through one of Walker's tar-extractors, and then through a Kirkham, Hulett, and Chandler washer, he had a temperature of about 20° to 24° or more in his first purifier.

Mr. STEVENSON said that, of course, the abstraction of the heavier portion of the tar could not be done by cooling. The temperature of the hydraulic main would be 300° or nearly 400°; and at the inlet of the condenser they would have 150° or less. Unless the heavier portion of the tar was taken out before this, they would have passed the period in which they could do it at such a temperature as to prohibit the tar absorbing the light vapours.

Mr. T. DUXBURY (Darwen) remarked that it had been very interesting to hear Mr. Stevenson relate his experience. Some of them had endeavoured to take a portion of the gas out of the tar; and some had succeeded better than others. He thought there could be no question that, as gas managers, producing a bye-product like tar or anything of that nature which could be turned into illuminating matter, if it could be done, they ought to do it—it was their duty towards their employers. But they could not have the halfpenny and the cake as well; and if, in getting an increased quality or quantity of gas per ton of coal, they robbed the tar of that which somewhat reduced its richness or quantity, if it paid to do it, it was the best process to adopt. In any case, so far as the selling of the tar was concerned, the tar distillers usually looked after themselves—at all events, he had found it to be so. On the other hand, he did not think there were many owners of gas-works who would have much to say in either making a concession or taking a less price per ton of tar, providing a certain amount of its valuable constituents were abstracted, and sent to the consumers in the shape of luminosity. He was pleased to hear Mr. Stevenson's explanation as to how he accounted for this. Mr. Stevenson took the thick tar from the bottom of the hydraulic main; and he should like to know whether he did it more than once a day. [Mr. STEVENSON: Once a day.] He (Mr. Duxbury) had not the arrangement in his own works; but if it could be provided without much cost, it would be an advantage. With reference to Mr. Shires' question, there was no doubt that the gas, in passing through the purifiers, would increase in temperature. Everyone would find that was so as a rule. The very action that took place inside the purifiers was a thermal one, so to speak; and the temperature of the gas was consequently increased by passing through them.

Mr. STEVENSON concluded the discussion by saying that, as corroborating what he had said with respect to retaining the hydrocarbons in the gas, last year the Manchester Corporation Gas Committee contracted for a certain proportion of cannel and a certain proportion of coal; but during the year, they had been able to keep up the illuminating power of the gas with so much less cannel that they did not know what to do with it, while they had not enough coal to finish the year with, although what he had described had only been carried out on comparatively a small portion of their plant. They had been able to make 20-candle gas with 40 per cent. of cannel, whereas they formerly used 60 per cent.

The proceedings were brought to a close by the passing of a hearty vote of thanks to Mr. Carr for the able manner in which he had conducted the business of the meeting under somewhat disadvantageous circumstances.

After a short interval, a substantial tea was provided, to which most of the members remained; their number being augmented by a few friends.

EXPLOSIONS OF COAL DUST.

At a recent Meeting of the Manchester Geological Society, Mr. W. J. ORSMAN, F.C.S., read a short paper on the above subject, which was illustrated by experiments.

The author remarked that recent colliery explosions had shown the dangerous behaviour of coal dust in being able to carry on the explosive wave in the workings of a mine. Further, the valuable experiments of Mr. Galloway and Mr. Hall had proved the fact that a mixture of dust and air could, without the presence of coal gas, be ignited by means of a blown-out shot of gunpowder, and initiate an explosive wave. If coal dust was suspended in air, or even in oxygen gas, it was found almost impossible to ignite such a mixture by means of a naked flame; and owing to this difficulty, there were many people who still believed that explosions of coal dust and air were an impossibility. Professor Harold B. Dixon had shown that, where bodies containing carbon burned in air, it was probable that the carbon combined with the oxygen, forming not carbonic acid gas direct,

but the intermediate product, carbonic oxide, and that this gas then combined with oxygen to form carbonic acid. Professor Vivian B. Lewes had further shown that, while mixtures of coal gas and air were very difficult to ignite, the mixture became very inflammable if carbonic oxide gas was present. This might account for the case in which a blown-out gunpowder shot would not fire in coal dust. If they examined the resultant fumes generated on firing various explosives, it would be found that nearly all of them gave off more or less of this poisonous and dangerous gas—carbonic oxide. This was owing to the presence of an excess of carbonaceous material, added generally to cheapen the article. They could easily see how, if the heated gases from a blown-out shot containing carbonic oxide came in contact with suspended coal dust, if the temperature were high enough, the dust would readily catch fire and burn.

Mr. Orsman here performed various experiments to illustrate his remarks as to explosives, with regard to one of which—carbonite—it was very easily shown, even on a small scale, how dangerous the fumes might become. Mr. Orsman proved, by experiment, that on detonating 10 grains of this explosive, packed in a leaden cartridge case suspended in a strong steel cylinder, over 2000 cubic centimetres of mixed gases were obtained. On allowing the gas to escape by means of a small tap, it was found that, on applying a light, it would catch fire and continue burning. By mixing the gases from carbonite with air, shaking in coal dust, and applying a light, a fiery explosion occurred; the coal dust taking fire and burning readily. It might be argued, said Mr. Orsman, that it was very difficult to ignite coal dust with a blown-out carbonite shot. This was due to the low temperature of combustion; but if part of the cartridge happened to be blown out of the hole undetonated in a burning condition, an explosion of coal dust might be initiated. Further, the production of carbonic oxide in mines was very deleterious to health.

Messrs. Alex. Wright and Co. have taken a very large factory in Trafalgar Road, Old Kent Road, exclusively for the production of their new improved coin-freed meter.

The Bacteriology of Sewage.—The Main Drainage Committee of the London County Council have made a report on the result of the investigations carried out by Mr. J. Parry Laws, F.I.C., and Dr. F. W. Andrewes into the bacteriology of sewage. These investigations show that, if the organisms existing in sewer air were derived from those existing in sewage, the bacteria of sewer air should bear a close resemblance to the bacteria of sewage. On contrasting the prevailing organisms of sewage with those of sewer air, they were found to bear no resemblance whatever to one another. Attention was also specially directed to the possible occurrence of the typhoid fever bacillus and the diphtheria bacillus in ordinary London sewage. Therefore every colony which seemed likely to belong to either of these species was the subject of careful investigation. No evidence, however, of their occurrence in ordinary sewage was found. Experiments were made to determine the fate of the typhoid bacillus in sewage, in order to verify or disprove the statement made by many writers that disease germs, such as the typhoid bacillus, find in sewage a suitable soil for their growth and multiplication. On careful investigation, it has been found that the bacillus of typhoid fever is not only incapable of any growth and multiplication in sewage, but that after the first 24 hours it slowly and surely dies out; its ultimate death under natural conditions being a matter of a few days, or at most one or two weeks. If the organisms which exist in overwhelming numbers in sewage do not exist in sewer air, how indefinitely remote is the possibility of the existence of the typhoid fever bacillus in the air of sewers.

The Purification of Potable Water.—We learn from the *Chemical News* that the distinguished French chemist M. Maumené has been experimenting on the disinfection of drinking waters, &c. In his operations he makes use of potassium permanganate, which certainly burns up a number of organic impurities, and has the decided advantage of being harmless in any quantity likely to be ingested. His method is extremely simple. It consists in the use of a dilute solution of potassium permanganate (15·8 grammes to 1000 cubic centimetres of water) in greater or smaller quantity according to the amount of impurity to be destroyed. In from 15 to 20 minutes, the solution in question is rendered pure. At a recent meeting of the Chemical Society of Paris, there was a discussion on the novelty as well as the sanitary admissibility of M. Maumené's process, for which a patent seems to have been obtained. It was recognized that potassium permanganate has long been in use for determining the organic impurities in waters, and no less in the purification of sewage. But the inventor argued that the final purification of drinking water in this manner had not been attempted. In this, he seems to have been mistaken. In 1873, Professor Crookes at the request of the Army Medical Department, made some experiments on polluted waters; and he recommended as an addition to the impure water the following mixture: Calcium permanganate, 1 part; aluminium sulphate, 10 parts; and fine clay, 30 parts. This mixture, in the proportion of 1 cubic centimetre to 10,000 parts even of London sewage, effected a rapid purification. The addition of the other ingredients along with the permanganate had the object of expediting the process, and of precipitating other impurities and living organisms upon which the permanganate alone had no immediate action.

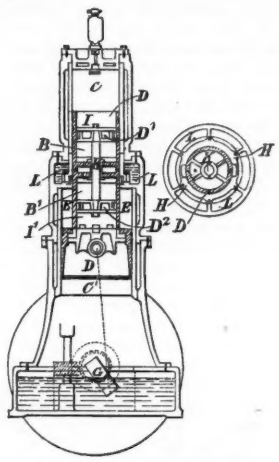
REGISTER OF PATENTS.

Gas and other Internal Combustion Engines.—Foster, H. F., of Cornwall Road, W. No. 2064; Jan. 31, 1894.

The object of this invention is "to get a higher grade of expansion of the working gases, to give an impulse every revolution, and to relieve the sudden shock or jar due to the explosion on the working parts, by a special air-compression buffer device placed within the piston, thereby ensuring the smoother running of the engine at high speeds, and also when exhausting to entirely discharge the products of combustion."

The power is developed alternately at each revolution in two cylinders placed one above the other—that is, an impulse is first given by the upper cylinder in one revolution, and then by the lower in the next revolution. There is a peculiar cycle of operations to effect the proper distribution of the working gases, by employing a trunk piston common to both cylinders—the lower cylinder and piston forming an enlargement to the upper part; the annular space thus formed being made equal in area (or any other suitable proportion) to the top cylinder. This piston is connected to the crank-shaft by a connecting-rod; and it has within it the air-buffer and compression chamber device already alluded to.

The cycle of operations to obtain an impulse every revolution is as follows: 1. On the down stroke, the upper cylinder charge is exploded, while the bottom cylinder is taking in a new charge. 2. On the up stroke, while the upper cylinder is exhausting, the lower cylinder is compressing its new charge. 3. On the down stroke, the lower cylinder is exploding, while the upper cylinder inhales its new charge. 4. On the up stroke, while the lower cylinder is exhausting, the upper cylinder is compressing its new charge. Thus, during the four strokes, two explosions are obtained.



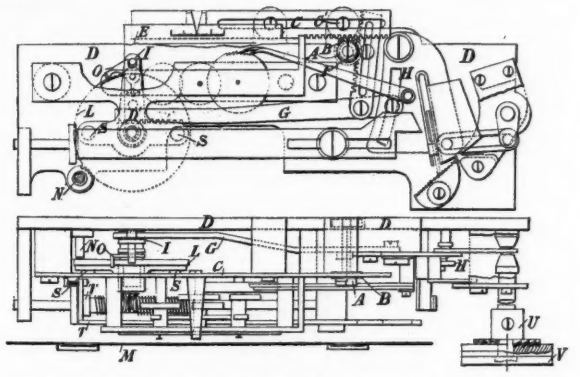
As shown in the engraving, the two cylinders C and C¹ are placed tandemwise, having a trunk piston D common to both cylinders. The bottom cylinder and piston form an enlargement to the upper part; the annular space E thus provided being proportioned to the top cylinder C. This main piston, operating in the two cylinders, is connected to the crank G by a rod. Within the main piston D, the inner pistons D¹ D² work, so as to form alternately the combustion chambers I I for the two cylinders, and also at the same time two cushioning chambers B B¹, in which the impact of the explosion is received and in part absorbed—to be given out again in the down stroke. In the upper part of the shell of the lower cylinder is the lubricating chamber L, in direct contact with the main piston D, and with the inner piston-rod K, through ports in the main working piston. The manner of achieving this is shown in the vertical section of the engine. The lubricating chamber L contains the stuffing-box H, which seals the lower cylinder, and through which the oil and water permeates, entirely surrounding the main working piston. The piston is divided into four chambers, two of which form, through ports a means of lubricating the inner piston-rod K, and the other two provide air-inlets to the buffers B B¹.

The action of the engine is as follows: Assuming that the upper cylinder C has taken in its explosive mixture at atmospheric pressure, and that the bottom cylinder C¹ has exploded its charge, on the up-stroke, the contents of the upper cylinder will compress into the space I (forming the combustion chamber), and will force the inner piston D¹ into such a position that the pressure in C is equal to the pressure in the air-buffer B. At the same time, the lower piston D² will force out the burnt products of the previous explosion in the cylinder C¹ through the ports. The top cylinder will now ignite its charge, storing up the force of the explosion in B, and expanding B¹ below atmosphere. On the down stroke of the main piston, a new charge is inhaled in the cylinder C². On the ensuing up stroke, the charge in the annulas E is compressed into the lower combustion chamber I, through the ports; forcing the inner piston up, and expelling the products of combustion from the top cylinder C. In a similar manner, complete elimination takes place at the moment of explosion of the lower charge; the air chamber B¹ being compressed, in its turn, as B in the previous stroke.

Prepayment Gas-Meters.—Thorp, T., of Whitefield, Lancs., Marsh, T. G., of Manchester, and Haynes, J., of Liverpool. No. 1613; Jan. 25, 1894.

The main object of this invention is to allow the cover or lid of the prepayment mechanism to be sealed by the meter-testing inspector, while at the same time rendering possible the regulation of the quantity of gas supplied for a coin, by the Company's officers. The mechanism for this purpose will, of course, in each case depend upon the arrangement of the prepayment mechanism applied to the meter.

For the prepayment mechanism described in patent No. 23,924 of 1892, the arrangement would be as shown in the engraving—a front view with the dial-plates and cash-index removed, and a plan of the mechanism. Only those parts are shown which relate to this present invention.



On a spindle A, that can be rotated by a screw-driver or box-key, a spur-pinion B is fixed, gearing with a rack C, which is guided by studs screwed into paps on the back plate D of the mechanism, and carrying a pointer, which moves in front of the dial-plate E. Another pinion F on the spindle A gears with a vertical rack guided on a stud passing through a slot in the rack, or by equivalent means; so that the rack can move up and down, and also oscillate. The lower end of the rack is connected by a pin or stud to the connecting-rod G, transmitting the oscillating motion of the coin-carrier H to the lever I mounted loose, and actuating the large wheel L, whose motion opens the gas-valve. The right-hand end of the connecting-rod G has a stud or pin fixed upon it, which moves in a curved slot of the coin-carrier. The other end of the connecting-rod G is preferably formed with rack teeth, gearing with a spur-wheel fixed on the boss of the lever I. This lever thus receives an oscillating motion from the coin-carrier H at each insertion of a coin.

By turning the regulating spindle A, the two racks are moved simultaneously; the horizontal rack C moving the pointer in front of the scale, while the vertical rack moves the stud or pin in the slot of the coin-carrier H nearer to, or farther from, the centre on which the coin-carrier oscillates. In this way, it varies the length of the movement of the connecting-rod G and lever I; and thus alters the quantity of gas supplied for each movement of the coin-carrier, or each coin inserted into the slot, in the manner described in the former patent. For the purpose of turning the spindle by means of a screw-driver without opening the case, there is a small opening in the front plate M of the case enclosing the mechanism, which is arranged so that it can be covered with a plate or cap, and sealed up by the gas company after the volume of gas to be supplied for each coin has been adjusted by turning the spindle till the pointer has arrived at the division of the scale denoting this volume.

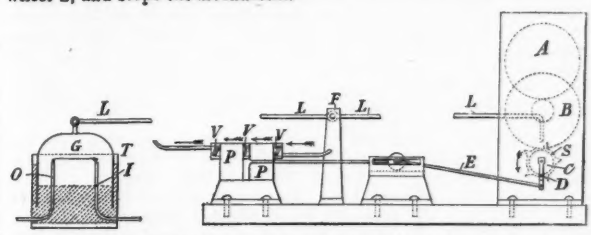
The cases of prepayment meters as hitherto arranged have also to be opened for the purpose of returning the pointer of the unconsumed gas-index to zero, whereby the mechanism and consumption index are exposed to tampering. Such "racking back" has to be done on a change of tenants or transfer of the meter from one place to another, when the gas paid for has not been entirely consumed. Tampering with the indices is prevented by arranging a second spindle, or its equivalent, connected by suitable mechanism to a part operating the movement of the pointer of the unconsumed gas-index; either bringing the spindle to the outside of the case, and there sealing it fast when the pointer has been set to zero and the spindle disconnected from the operating part, or preferably making a small opening in the casing for passing a key or its equivalent through, and turning the spindle or other part, and operating the pointer by means of the same.

With mechanism such as that described in the previous (1892) patent, the patentees preferably make a small opening in the front M of the casing; and opposite the opening is fixed a peg N in the back plate D of the mechanism. Upon this peg a key formed near to its end with a pinion can be placed through the opening, which pinion, when inserted, will gear with the large ratchet-wheel L, whose motion opens the gas-valve, and actuates the pointer of the unconsumed-gas index. The ratchet-wheel is, in this case, made with fine spur-wheel teeth. In order to allow the wheel L to be turned in the direction required for bringing the pointer back to zero, the pawl actuating the wheel must be lifted out of the teeth in the following manner: The pawl O is hinged on a pin fixed in a lever mounted loose upon the stud on which the wheel L turns. The pawl is formed with a slotted extension as shown; and a peg fixed in the end of the lever I, and passing over the top of the lever O, engages into the slot. When the lever I receives a forward oscillating motion after the insertion of a coin, the pawl is pressed into the teeth of the wheel L by the peg in the lever I, and the levers and wheel then move forward together.

Increasing and Regulating the Pressure of Gas in Houses, Factories, &c.—Jameson, J., of Newcastle-on-Tyne. No. 3078; Feb. 13, 1894.

This invention consists in the application of mechanism between the gas-meter and the burners, of an exhausting and compressing arrangement (worked preferably by clockwork), whereby when there is not adequate pressure of gas in the supply-pipe for the purposes required, an additional pressure may be supplied at will.

An illustration is given of the regulating arrangement proposed. G is a gasholder of small size, floating in a tank, the inlet and outlet pipes of which I O are above the level of the water at all times. This arrangement is placed in the way of the gas the pressure of which it is desired to regulate. As the pressure within the holder increases it rises, and as the pressure diminishes it falls; but at its lowest point, it does not close the passage between I and O. On the top of the holder, there is a lever L, turning on the centre F; so that when there is an excess pressure of gas, the other end of the lever engages in a star-wheel S, and stops the mechanism.



A, B, and C are a train of clockwork, in which A is a spring-barrel geared to a pinion, and C is a pinion geared to the wheel B in the usual way. The shaft in the centre of C carries a crank D; and the crank (through the connecting-rod E) produces reciprocating motion in the piston of the pump P. The valves of the other pump V open in the direction of the arrows. It will thus be seen that the movement of the train of clockwork tends to produce an increased flow of gas; and, in proportion to the size of the apparatus and the outlet or consumption, there is a pressure of gas which may be regulated at will.

Electric Lighter for Gas-Burners.—Peterson, M., of Stockholm No. 3294; Feb. 15, 1894.

This invention relates to apparatus for lighting by electricity the gaseous mixture issuing from a Bunsen or other atmospheric burner with which an incandescent body is used for illuminating purposes. The principal object of the invention is "to save the incandescent body from injury, both when it is being fitted on the burner, and during the use of the lighting apparatus, for which purpose the break in the electric circuit that causes the spark for igniting the gaseous mixture is arranged to take place within the incandescent body."

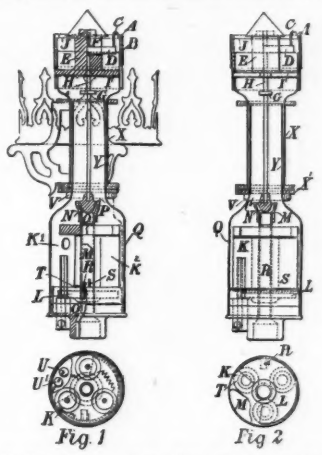


Fig. 1 Fig. 2

Fig. 1 is a vertical section and a plan of the apparatus; the lower part being partly in elevation, and the electric circuit and the gas-valve being both represented as closed. Fig. 2 is analogous to fig. 1, but with the parts at the top and bottom of the casing in elevation, and with the electric circuit broken, and the gas-valve open; also the armature and the bottom-plate of the electro-magnets as seen from below when the lower end-piece of the burner casing is removed.

The break in the electric circuit by which the lighting spark is produced is arranged to take place at A, within the incandescent hood, and close to the place where the gaseous mixture normally burns. The spark is formed between an insulated conducting-ring B, round which the lower part of the hood or body is pushed, and a moveable contact C, which is connected by an arm D to a metallic rod H, which slides in (and is guided by) a centrally-arranged guide-piece E, and is provided with a contact-disc G at its lower end. The central guide-piece E is fixed to the upper part of the burner by arms I, between which the mixture of gas and air flowing upwards can pass freely. K K^1 K^2 are three electro-magnets, arranged vertically in a circle. L is their common armature, loosely surrounding the extension O of the gas-supply pipe, and fixed to a tube M, which can slide on the extension. To the top of the tube is secured a gas-valve N, the seat of which is formed by the top of the extension O. This extension is thus closed by the valve N, when the latter falls upon its upper end, by the complete descent of the armature L, and is opened when the valve is lifted by the ascent of the armature. P are gas-outlets formed in the upper part of the tube M carrying such valve. Secured to the valve N is a vertical conducting-rod, against which the contact-disc G is caused, by means of the spring F, to bear, even when the valve N and the electric circuit are closed; so that, by the lifting of the armature L, the rod will be caused to raise the disc G, and consequently also the contact C.

The burner is provided with two binding-screws U and U^1, each of which is connected with a switch in such a manner that an electric current from a suitable generator of electricity can be sent, as desired, through one or the other of them. From U a wire passes to the electro-magnet K^1, which is connected to the electro-magnet K^2. From this electro-magnet a wire passes to a ring V fixed to, but insulated from, the lower part of the burner. The sleeve X of the upper part of the burner, which is passed over the tubular extension Y of

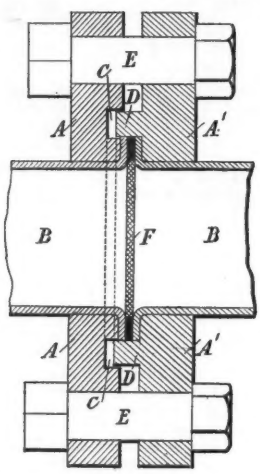
the lower part, has at the bottom an insulated conducting-ring, which bears against, and makes contact with, the ring V. From this insulated ring a wire also passes to the insulated ring B, against which the contact C normally bears. The contact is normally in electrical connection with the earth through the arm D, rod H, contact-disc G, valve N, surrounding tube M, tubular extension O, and the gas-supply pipe. The contact C is also normally in connection with the earth through the arm D, the central piece E, the casing of the lamp, and the gas-supply pipe. One pole of the electric generator is also in this case connected to earth. The binding-screw U^1 is connected to the electro-magnet K; and the latter is connected to the common bottom plate T of the electro-magnets, supported by the extension O of the gas-supply pipe, and in electric connection with it.

The plate T is formed with a small hole, through which passes a hook R fixed to the armature L. At one side of the hole, there is a support S, which projects upwards from the plate. The shape of the armature in plan is somewhat like that of a sector greater than a semicircle; the gap in the armature being situated between the electro-magnets K and K^1. A piece of wire-gauze is arranged in the ordinary manner at J; and holes are provided in the casing at G for the entry of air to support combustion.

In order to ignite the gaseous mixture issuing from the burner, an electric current is passed through the binding-screw U and the windings of the electro-magnets K^1 and K^2, which thereby attract the armature L upward. By this movement of the armature and tube M, the valve N is opened, and the moveable contact C raised from the ring B, thereby producing the required lighting-spark at A. In consequence of the peculiar form of the armature, it will, when attracted by K^1 K^2, be partly turned in a direction towards the electro-magnet K^1, in such a manner that the hook R will be brought over the upwardly-projecting support S. When the current ceases, the armature will fall; but the hook will be arrested by the support, and thereby prevent the complete descent of the armature. Thus the gas-valve N is caused to remain open. In order to put out the flame, an electric current is sent through the binding-screw U^1 and the winding of the electro-magnet K only. The armature will then be again lifted, and turned towards this electro-magnet in such a manner that the hook will be removed from above its support; and when the circuit is again broken, by means of the switch, the armature will fall into its lowest position, close the gas-valve N, and restore the contact at A.

Pipe-Joint.—Menzies, J., of Glasgow. No. 5621; March 17, 1894.

The patentee proposes to employ a pair of annular flanges A A^1 slipped over the ends of the tubes B to be connected—one flange for each tube. One of the flanges A is made with a circular or other recess or groove C, into which is fitted a rib or pap D formed on, or attached to, the other flange A^1. The position of the flanges upon the ends of the tubes is such that a space is left between the faces of them



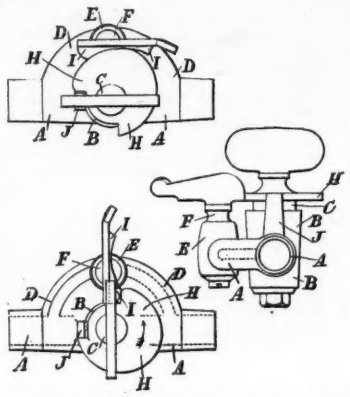
for the purpose of allowing the necessary tightening up, by connecting the flanges by an arrangement of bolts and nuts E. A space is preferably left between the faces of the flanges, as shown, for the reception of an india-rubber ring F, or other equivalent packing. A coupling or joint thus formed is said to be an effective water or gas tight joint when the flanges are clamped up.

Guard for the Mantles of Incandescent Gas-Lamps.—Duncan, W., of Edinburgh. No. 6233; March 28, 1894.

This guard for the mantles of incandescent gas-lamps is intended to prevent them being damaged when putting on the glass chimney. The appliance consists of a metal band placed around the ordinary globe-carrier or gallery; and to the band are fixed three upright wire rods, held rigid at their top ends by a wire ring—the uprights acting as guides to receive the chimney, so that it cannot be brought in contact with the mantle.

Controlling the Supply of Gas to Stoves.—Voisey, C. B., of Liverpool, and Richmond, E. W. T., of Warrington. No. 21,574; Nov. 9, 1894.

The object of this invention* is to provide means in connection with the gas-supply pipe of the stove burner, by which, "when gas is turned on, or the supply opened by the tap or cock, or conversely turned down, an aperture is opened thereby, which will supply such a quantity of gas that no matter what amount of diminution of the main supply takes place, sufficient will be supplied by this special means to prevent the back-firing of the burner or its extinction; and this quantity may with advantage be the minimum which will keep the burner properly lighted."



A are the inlet and outlet branches of the main or primary tap. B is the plug-case of it. C is the plug working in the case B. D are branches leading from and into the main-tap branches A, and by which the minimum quantity of gas is supplied when the main or primary tap is closed. E is the plug-case of the minimum-supply tap on the branches D; and F, the plug working therein. H is a cam-shaped projecting part on the upper part of the plug C; and I is a ledge upon the upper part of the plug F—these two parts being in the same horizontal plane, and adapted to co-act as hereafter described. J is a projection on the primary tap, acting in connection with the part H, and serving as a stop to limit the movement of the plug C, in both directions to 90°.

In the position of the plugs shown in the bottom view, both taps controlling the main supply and the minimum supply are closed to their respective passages A and D, so that no gas can be supplied. To supply gas, the handle of the main-supply tap is turned in the direction of the arrow, the effect of which is that the end of the projection H, being arranged in relation to the ledge I on the minimum-supply tap plug, as shown, that plug is moved round the same degree, practically, as the main-tap plug (namely, 90°) into the position shown in the top view. In this condition, both taps are fully opened, and gas full on. Then, whatever may be done with the main-tap in the way of turning down the gas or regulating the supply, it does not affect the minimum-supply tap plug F—that plug remaining fully open; and assuming the plug C were turned backwards the full 90° (turning off the whole main supply of gas), the minimum-supply plug F will still be fully open, and a supply of gas to the burner through its passage D fully sufficient to give such a pressure of supply at the burner as to prevent back-firing due to diminution. Whatever the lower limit of pressure at which a gas-burner used in connection with the controlling device may be considered safe and right to be worked under, the capacity of supply of the bye-pass or secondary passages D, and tap plug F, must be made to correspond.

The cam H is of practically the same radius for that portion which works in connection with the ledge I of the minimum-supply tap; the ledge I being of concave form, corresponding substantially with H. By this means, the plug F cannot be moved by its handle when the plug C or the main-tap is fully opened. By this means, mistakes cannot be made with respect to the right tap to be used, when it is desired to diminish the supply of gas from the full supply; it being only possible to turn the minimum-supply tap so as to shut off all supply of gas to the burner when the main-supply tap is closed.

Hand Starting-Gear for Gas-Engines.—Armstrong, T. H., of Willington Quay. No. 22,852; Nov. 26, 1894.

The inventor proposes that the engine-shaft should be fitted with a loose sleeve or bush, in which is fixed a pin, on which a turning handle fits. In starting the motor, the handle is turned smartly round in the direction of rotation of the engine. In this operation, the heel of the handle, being slightly eccentric, grips the shaft firmly, and speed on the shaft is obtained. When the engine gets an impulse, the speed of the shaft becomes accelerated, the heel is forced from the shaft, and leaves the handle disengaged in the operator's hands, and the engine-shaft is then free to revolve without any friction on the handle or bush. In the event of a back-explosion—that is, should the engine get an impulse too soon, and thus cause it to revolve in the wrong direction—the position of the sleeve or bush is so arranged that the pin is always in a line with the crank of the crank-shaft. Thus the back-explosion can only take place when the crank and the sleeve or bush are on or near the bottom centre; and in that case the operator will be pulling the handle towards him, so that it will naturally lose its grip without danger.

Gas-Stoves—Dresser, W., of M. Gladbach, Germany. No. 24,265; Dec. 13, 1894.

This invention relates to a reflector gas-stove, with an ordinary adjustable burner placed in front of the reflector as usual. The air for combustion enters through a narrow canal arranged under the reflector, in order to heat it before reaching the burner. The gaseous products of combustion, which do not enter the room, are conducted through a series of flues arranged at the top of the stove, so as to form an up-and-down zig-zag course, during which they impinge repeatedly against the highly heated metallic roof of the combustion chamber. The flues are arranged so as to leave intermediate spaces surrounded by the flues. These horizontal air-chambers communicate with the

* The invention was briefly alluded to in the JOURNAL for Jan. 22, p. 166.

air of the room at both ends, and contribute to the heating effect of the stove by heating the air in contact with the walls of the chambers. Any water formed by condensation of the vapour in the flues drops upon a plate kept in a heated condition, where it is again evaporated, and led toward the chimney-flue.

APPLICATIONS FOR LETTERS PATENT.

2437.—Morison, D. B., "Generating gas, such as acetylene." Feb. 4.
2459.—Graham, W. E., and Biddle, F. H., "Log gas-fire." Feb. 5.
2470.—Hughes, W. A., "Incandescent fire frame." Feb. 5.
2485.—Patterson, J., "Utilizing the waste heat of furnace gases." Feb. 5.
2497.—Dieltiens, F. E., "Tubes for artesian wells." Feb. 5.
2550.—Crastin, C., "Gas-engines." Feb. 5.
2570.—Meason, C., and Ford, T., "Chandeliers, electroliers, pendant hanging lamps, and brackets for gas, oil, or electric light." Feb. 6.
2594.—Pennink, J. M. K., "High and low pressure gas-generator." Feb. 6.
2611.—Germains, A. Z., "Globeless chimneys for oil and gas lamps." Feb. 6.
2638.—James, W., "Gas and oil engines." Feb. 6.
2660.—Morgans, A. E., "Production of cyanogen compounds." Feb. 6.
2679.—Busse, M., "Incandescent gas-burners." Feb. 7.
2717.—Gatcke, F. E., "Counteracting, deflecting, and distributing gases and flames." Feb. 7.
2732.—Kroll, O, "Refractory bodies for use in gas and other burners." Feb. 7.
2820.—Bullier, L. M., "Manufacture of carbides or acetylides of the earth metals and alkali-earth metals." Feb. 8.
2838.—Friedeberg, A., "Production of illuminating gas." Feb. 8.
2855.—Cliffe, W. A., "Oil or gas oven." Feb. 9.
2858.—M'Caig, W., "Gas-fires or burners." Feb. 9.
2868.—Chesterton, W. J., "Perdifumes for gas and oil lamps and lights." Feb. 9.
2879.—Barron, A., and Schofield, W., "Gas-furnaces for melting glass." Feb. 9.
2881.—Bell, W., "Gas-heated boiler." Feb. 9.
2926.—Doty, H. H., "Lanterns for street and other lamps." Feb. 9.
2946.—Pease, E. L., and Ashmore, Benson, Pease, and Co., Ltd., "Retort for chemical processes." Feb. 11.
2992.—Sugg, W. T., "Self-regulating gas-burners." Feb. 11.
3015.—Conrad, W. S., "Preventing water-pipes from bursting in frosty weather." Feb. 12.
3018.—Fourness, H., "Gas-heated incandescent lamps." Feb. 12.
3056.—Jousset, C., and Prince, F. O'C., "A new gas." Feb. 12.
3081.—Essinger, A., and Parrott, W., "Ventilating box-cover for electric lighting culverts." Feb. 12.
3085.—Jahnsson, J., "Electric gas lighting devices." Feb. 12.
3089.—Humphreys, A. C., and Glasgow, A. G., "Carburetting water gas, and apparatus therefor." Feb. 12.
3125.—Meason, C., and Ford, T., "Brackets for gas, oil, or electric light." Feb. 13.
3172.—Coke, A., "Ventilating the pipes, manholes, chambers, &c., containing the wires conveying electricity through streets and public ways." Feb. 13.
3178.—Macpherson, W., "Testing and junction boxes, manholes, and culverts for electric light mains and other purposes, and the covers therefor." Feb. 13.
3190.—Gardner, W., "Water-pipes." Feb. 13.
3266.—Wright, F., "Adjusting gear for coin-freed fluid-meters." Feb. 14.
3333.—Prince, F. O'C., "Producing and regulating the outflow of gas produced from a mixture of ingredients." Feb. 15.
3350.—Cockson, C., "Standard lamps." Feb 15.
3354.—Brentini, P., "Manufacture of gas for lighting and heating purposes." Feb. 15.
3357.—Stanley, R., "Explosion engines." Feb. 15.
3418.—Dyrenforth, D., "Gas or vapour engines." A communication from J. J. Finney. Feb. 16.
3423.—Gardner, W., "Water-pipes." Feb. 16.
3424.—Hancock, D, Craig, J. B., and Hancock, A. H., "Incandescent carburetted air or gas lighting." Feb. 16.
3425.—Hancock, D., Craig, J. B., and Hancock, A. H., "Carburetting apparatus." Feb. 16.
3452.—Lawden, J., and Poole, F. S, "Bending or shaping pipes, rods, and other analogous articles." Feb. 18.
3487.—Strache, H., "Generation of water gas from coke, coal, or other fuel." Feb. 18.
3567.—Meynell, W., "Supporting globes and domes of gas lights (incandescent or otherwise) and other lights." Feb. 19.
3577.—Bronder, G. A., "Gas-retort charging apparatus." Feb. 19.
3608.—Young, F., "Fire-clay refractory and non-conducting bricks and blocks, building bricks, or the like." Feb. 19.
3654.—Rowlands, R. N., "Burners and regulators for lamps." Feb. 20.
3681.—Soutter, E., "Apparatus to be employed for heating, lighting, and cooking." Feb. 20.
3689.—O'Neil, D., Thompson, G., Fisher, E. A., and Kuichling, E, "Caulking the joint of pipes and mains." Feb. 20.
3715.—Torres, J. B., "Production and manufacture of gas, gaseous compounds, and hydrocarbides." Feb. 21.
3718.—Holgate, C. H, and Paul, R., "Valves and taps for steam, water, gas, and other purposes." Feb. 21.
3719.—Smith, C., "Constructing the socket ends of rainwater pipes or down spouts and similar pipes." Feb. 21.
3745.—Willis, J., and Adrain, H. A. O., "Water-pipes, and tools for their manufacture." Feb. 21.
3760.—Gordon, J., "Preventing bursts in water-pipes through the action of frost or other changes of temperature." Feb. 21.
3783.—Warner, K., and Rackham, R., "Gas motor engines." Feb. 21.

CORRESPONDENCE.

[We are not responsible for the opinions expressed by correspondents.]

Mr. L. T. Wright's Paper at the Society of Chemical Industry.

Sir,—As Mr. L. T. Wright, in his letter which appeared in your last issue, seems inclined to split straws, I should like to point out that, though two meanings may be attached to the verb "to ignore"—viz, "to disregard" and "to be ignorant of"—the latter is almost an obsolete one, and I am greatly surprised that Mr. Wright appears to infer my use of it. I stated that he seems to ignore the hydrogen density. He is reported to have said in the discussion: "A gas that gave 50 volumes of carbon vapour after making a deduction of the carbonic acid, would give a value of between 16½ and 17 candles. He believed that value was very close." This appears to me to be very much like "ignoring" the hydrogen density. Moreover, his quotation of Mr. Lacey's remarks should have included the next sentence, which then makes it read thus: "Mr. Wright did not appear to attach much importance to the combination of the carbon with the hydrogen—that was to say, the hydrogen density—although some ten or twelve years ago, it was regarded as of great importance. In considering the effect of the hydrocarbons, Mr. Wright was inclined to disregard it—at least, he (Mr. Lacey) thought that was the effect of his experiments."

I trust that Mr. Wright's sense of the unimportance of locality in determining the price and quality of the gas supply will not be too much shocked by my saying that I am disposed to regard the circumstance he mentions, of the Liverpool Gas Company importing some of their material from a distance of 15,000 miles, as a point in my favour. Liverpool, by virtue of its being a seaport, evidently has command of material which only a few miles inland assumes the aspect of an almost unattainable luxury.

Now, with regard to the question of high heats, can Mr. Wright's appeal to clay retorts avail him much? It was my experience with these that shook my faith in the "high heat" theory, as propounded by Mr. Wright and others, and led me to put the matter to the test of experiment.

Mr. Wright desires to know what grounds I have for not being able to agree with him that the addition of enriching material is an economical means of raising the heating power of coal gas. Perhaps he will forgive me if I answer this question in the Hibernian way, by asking another—viz., What grounds has he for stating that "they obtained with increased lighting power, a corresponding increase in the heating power"?

Birmingham, March 1, 1895. Charles Hunt.

Peebles Oil Gas below Freezing-Point.

Sir,—As I thought our experience during the recent severe weather, with our coal gas enriched exclusively with oil gas made by the Peebles process, might be of interest, I am taking the opportunity, through your columns, to inform my friends that we have had almost entire freedom from stopped service-pipes, and have hardly found a trace of naphthalene either in the mains or anywhere outside the works; and our coal, which is of the cheapest quality, is being carbonized at a high temperature.

Our illuminating power is being maintained at from 18·75 to 19 candles; and we have not needed to increase the percentage of oil gas used. This goes to prove that not only is oil gas, made by this process, permanent itself, even when exposed to very low temperatures, but it assists in keeping the less permanent coal gas from being deprived of any of its light-giving constituents.

There having been little snow on the ground here before the frost came, it has penetrated to a greater depth than we have ever experienced before; and those of our lamp risers which are stopped, are found to be plugged just below the ground-line with ice, in which we have been unable to discover, by careful examination, any trace of deposited hydrocarbons.

St. Helens, March 2, 1895. S. Glover.

The Relative Efficiencies of Acetylene and Other Artificial Illuminants.

Sir,—"*Facit indignatio versum*" is evidently a tenet of Mr. Denny Lane's lay; and as I, for one, cannot permit him to sing to too high a pitch unless he at the same time trills forth his notes in truth and consonance, and does not attempt, as he has done on this occasion, to cover up his retreat by a sally of wit quite uncalled for, I propose to weary your readers with a few more remarks ere I recline in slumber on the subject of the commercial value of acetylene.

I was not aware that Mr. Denny Lane had so far bedimmed his spectacles with the smoke of gas that they could see nothing beyond them; and when he states that it is a thankless task "to plough the sand," he has, I fancy, set himself the task by entirely ignoring my statements as to whence the cost of the electricity assumed in the calculations I put forth was derived.

It must be remembered that I stated in my first letter: (1) "It will be observed that I have in all cases taken Professor Lewes's figures for the cost of the electrical energy;" and in my second letter: (2) "I, having no objection to the cost of the electrical energy being assumed to be 4d. per unit, append a further table and diagram worked on these figures."

Now, it must be present in the mind of your readers that Mr. Denny Lane, after showing that the average charge throughout the kingdom for the supply of electricity came to 4d. per unit, seeks on this occasion to take it at 8d. per unit. I, for one, do not for a moment mind what price he takes it at, for he must admit that "what is sauce for the goose is sauce for the gander"—*i.e.*, my contention is that if it costs x pence to generate current to produce acetylene, it should not cost more than x pence to apply the same to lighting direct. Mr. Denny Lane has not contested any of my figures, but those relating to *cost;* and hence your readers will see that he is something like the Scotch lad who quarrelled with his porridge on all grounds, but ended up by admitting that there "*baint enough of it.*"

Mr. Lane proceeds on his way with a "*gaîté de cœur*" quite charming to observe in one who is so venerable. But when he, in a spirit that I entirely fail to appreciate, holds me up to scorn as the "*monstrum nulla virtute redemptum a vitiis*," and straightway pitches me into a gondola with the famous Mr. W. H. Preece, I take objection, seeing that I have, from time immemorial, sought fit "to paddle my own canoe." Mr. Denny Lane, with a respect which I do, however, appreciate, refers to my renowned father; and I must say that, had he lived, I am vain enough to be of the opinion that the gas industry would have been no worse off.

Without wishing to trespass too far on your valuable space on a subject which has, in my opinion, become somewhat prosy, I would like to remark that, when a boy at school, I had to be content with collecting a goodly number of the unburnt portions of "rushlights" before I could in the slightest degree satiate myself with sufficient illumination for a nocturnal feast. Later on, gas, with iron burners, replaced these primitive "betallowed flags;" and later on again I devoted some of the happiest years of my life to the production of electric lamps. That I should be abused for my pains is no surprise, as my lamented father, who entered the gas profession some forty years after its birth, was roundly abused as a madman and a fool for so doing; and more so when he was sanguine enough to invest a goodly sum in fully-paid *ten pound shares* (which he purchased for *ten shillings each*) in what afterwards proved to be a very successful company.

Fie, fie! Mr. Denny Lane. I have always looked upon you as, at heart, a scientific man, and did not believe you would have looked through such a grimy pair of spectacles.

FRANK WRIGHT.

21, *Old Queen Street, Westminster, S.W.*,
March 2, 1895.

The Restoration of Persons Overpowered by Gas.

SIR,—There appears of late to have been several lives lost through suffocation by gas. While I had the management of London gas-works, it fell to my lot to have a good many alterations and extensions to make; and I frequently had men "down," but I never lost one. My mode was as follows: On questioning the men after restoration, I found that they were quite unaware of anything; they only "felt a little queer," and became unconscious. Whenever any critical work was to be done, I made it a point to be present. I kept up a little conversation with the fitter, for the mere purpose of getting replies, by which I would know he was "all right." Should he get caught, I immediately had him out, and placed vertically against a wall, had him punched about the body, and when he became conscious gave him a glass of brandy from a bottle kept for the purpose; and I never found that the men had any ill-effects from it afterwards.

I do not think there is even a remote probability of loss of life if immediate and proper attention is given; but if a man is left to lie horizontally, or perhaps carried on a stretcher to a hospital, the chances are all the other way.

GEORGE ANDERSON.

35A, *Great George Street, Westminster, S.W.*,
March 1, 1895.

The South Metropolitan "Workman-Director" Proposal.

Yesterday a letter was received from Mr. George Livesey, in answer to the one by Colonel Makins appearing in last week's number of the JOURNAL. Mr. Livesey's communication, however, came to hand too late to be inserted to-day; but it will appear next Tuesday.

M. Berthelot on the Combustion of Hydrocarbonaceous Compounds.

M. Berthelot has sent to Mr. B. H. Thwaite a letter on the above subject, in response to a request for his opinion in regard to the articles by that gentleman and Professor Harold B. Dixon which recently appeared in the JOURNAL (see *ante*, pp. 72, 214). The following is a translation of the letter:—

I commence by telling you that your experiments are very interesting, and that I have read them with much pleasure, not only because they are well done, but also because they conform in general to chemical principles, if we admit that the normal state of carbon would be the gaseous state, and the corresponding heat of combination. But let us leave that, as it was a question solely of the definite state. Now, real phenomena are more complicated, and depend upon the relative speed of the reactions and on the dissociation of the products—variable with temperature and pressure. In order to analyze them, it would be necessary to go to greater length than this letter permits. I will simply cite a few facts in support of your opinion, and others in opposition thereto. For instance, there is the fact that the explosion of the nitrate of dinitrobenzol* furnishes all the oxygen in the state of carbonic oxide, and all the hydrogen in a free state, except a little CyH. On the other hand, there is the progressive incomplete combustion of the hydrocarbons, which furnishes acetylene and carbon, and at the same time water. If the carbon always burnt in preference to hydrogen in the hydrocarbons, *there ought not to be produced either acetylene or free carbon*. But this effect will be the transitory result of a multiplicity of transformations, followed after a certain time by the unequal promptitude of cooling.

A Correction.—Owing to the accidental inversion of a figure in the amount at the end of the paragraph on the Harrow District Gas Company last week (p. 447), the position of the undertaking was shown to be less satisfactory than it actually is. The profit on the past half-year's working was £1738, as compared with £1640—not £1940.

Carburetted Water-Gas Plant for the Hornsey Gas-Works.—As illustrating the extended use that is being made of carburetted water gas, the Hornsey Gas Company have lately decided to erect plant for its production at their works; and the Directors have entrusted the contract for the complete installation to Messrs. Samuel Cutler and Sons, of Millwall.

* Azotate de diazobenzol.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Bills last week:—

Bills committed: Bristol Water Bill, Felixstowe and Walton Water Bill, Ilfracombe Gas Bill.

The Standing Orders Committee reported that the Standing Orders not complied with in respect of the Rotherham Corporation Bill ought to be dispensed with, and the Bill allowed to proceed, provided that clause 14 (as to the Corporation's future sources of supply) be struck out, and that all powers to acquire lands and easements under clauses 16 and 18 be limited to the parish of Whiston.

Petitions have been presented against the following Bills: Bristol Water Bill, Felixstowe and Walton Water Bill, Ilfracombe Gas Bill.

HOUSE OF COMMONS.

Monday, Feb. 25.

THE LONDON COUNTY COUNCIL AND THE WATER SUPPLY.

On the order for the second reading of the Chelsea Water (Transfer) Bill,

Mr. STUART moved that the second reading of the Bill be postponed until the 3rd of May, then to be further adjourned if the two similar Water Bills now referred to a Select Committee were still under consideration.

Sir F. DIXON-HARTLAND, in opposition, contended that, if these Bills were to go on at all, the understanding was that they were all to be proceeded with at once. If the object of the County Council was to obtain the two Bills now referred to Committee, for the purpose of working them against the other Water Companies, the House ought to know it.

Mr. STUART said there was an arrangement made in the House on the previous Friday that the consideration of these Bills should be postponed until the Bills which had passed the second reading had been reported upon. (Opposition cries of "No.")

Sir F. DIXON-HARTLAND denied that any such arrangement was made. Did the County Council want to compete with the existing Companies, in order to buy up their property more cheaply?

Mr. STUART said the Bills which had already passed the second reading would not allow the County Council to compete with the Companies at all. There was a great deal of conversation on the matter on the previous Friday; and he could assure the House that the arrangement he alluded to had been made.

Sir F. DIXON-HARTLAND said the Bills had better be put down for Thursday, when the matter could be discussed if necessary. He did not approve of this piecemeal way of dealing with the question. Either the County Council wanted to get the whole of the water supply of London into their hands, or they did not. If they did, they had better send the whole of the Bills to the same Committee.

Mr. STUART did not see why members should be brought down on Thursday to discuss a matter which was settled last Friday.

Sir JOHN LUBBOCK thought it was quite obvious that members must be present on Thursday when the hon. member (Mr. Stuart) was to move the instructions of which he had given notice. They must raise the whole question again; for what were the facts? On the amendment which he (Sir John) moved on the previous Friday 26 Metropolitan Members voted in favour, and only 16 voted against; and taking the home counties, which were also deeply interested in the matter, 27 members supported his amendment, and only 3 voted against him. But still they were beaten by 38; and of the majority, 80 members represented Scotland, Ireland, and Wales. It was very important to the interests of the ratepayers of London that the question should be discussed again. The Bills before the House would inevitably raise the rates; and the representatives of London had shown that they were overwhelmingly opposed to them. The whole question must be re-discussed; for they were not going to be defeated on a Private Bill with regard to a matter in which Scotland, Ireland, and Wales had absolutely nothing to do.

Captain BOWLES, on behalf of the Companies, repudiated the idea that any arrangement was made with the hon. member (Mr. Stuart).

Mr. DIAMOND protested against the view of the hon. baronet (Sir J. Lubbock) that Irish members had no interest in the matter. He was also a London ratepayer and was certainly interested in it.

Sir J. LENG also protested against the suggestion that only members representing London and the home counties were interested in these particular Bills.

Mr. STUART said, if there was a desire on the part of the House to defer the matter till Thursday, he would certainly fall in with it.

The remaining six Bills (relating to the Chelsea, East London, Grand Junction, Kent, New River, and West Middlesex Companies) were accordingly postponed till Thursday.

Thursday, Feb. 28.

On the motion to postpone the second reading of the Chelsea Water (Transfer) Bill till the 3rd of May,

Sir F. DIXON-HARTLAND said he objected to the postponement of the Bill. He saw no reason why the County Council should be empowered to use one Water Company in order to invade the district of another. He did not hold a share in the London Water Companies; but he had the honour to be Chairman of the Thames Conservancy, which looked on these Water Bills as a very serious matter. He and those who thought with him were strongly of opinion that the Bills should proceed *pari passu*. He had no objection to a central authority taking charge of the water supply of the Metropolis; but he was opposed to the Council being enabled to work one Company against another. He wanted all the Bills to be considered by the same Committee. He moved that the Bill be now read a second time.

Sir JOHN LUBBOCK said he was astonished at the line taken by the

hon. member for Shoreditch (Mr. Stuart), who was responsible for the motion to defer the second reading. When he himself ventured to move last week that the whole of the Water Bills should stand over until the opinion of the ratepayers had been expressed, the hon. member offered a most determined opposition. The Bills must inevitably lead to a very great increase in the rates, even if the County Council managed the water undertakings as economically as they were now, which he very much doubted, because the present ratepayers would have not only to pay for the water, but for the redemption of stock. To this argument, no answer had been attempted by those who supported the Bill. The analogies drawn from the case of other municipalities were entirely misleading, as there were no other municipalities to which the water companies stood in the same relation as did the London Water Companies to the Metropolis. Another argument put forward was that the authority having the supervision of the streets should also have the control of the water companies, so that there should not be two bodies having power of opening the roads. But in the case of London, this power did not rest with the County Council, but generally with the Vestries.

The SPEAKER pointed out that the question before the House was whether or not the second reading of the Chelsea Bill should be deferred.

Sir J. LUBBOCK said he would not pursue the argument further; but he had desired to explain to the House why he did not keep down the amendment previously standing in his name [to defer the consideration of the Bills till after the County Council election]. He was told that the Select Committee would take into consideration the views not only of those who represented the Metropolis, but also those representing outside districts.

Mr. STUART said the motion before them for deferring these Bills was for the purpose of carrying out a distinct understanding which had been arrived at. Last week he said: "We cannot consent to withdraw clause 6, but we are prepared to give *locus standi* to the other Companies on the first Bill, on the understanding that the other Bills will be postponed." He would not press the understanding if the hon. gentlemen felt that it did not exist; but May 3 was the earliest possible date, he thought, at which the second reading of these Bills could be taken. He should put down for Monday a resolution which would give *locus standi* on the first two Bills to all the Water Companies; and he should also move for the postponement of the second reading of the others until the first Bill was gone through. It had been suggested that county councils should have *locus standi;* and they had put this also into their proposed resolution.

Mr. BANBURY thought that the hon. member had not stated whether the London County Council intended to proceed with all the eight Bills, or whether they were postponing the last six for an indefinite period.

Mr. STUART said the only reason for the proposed postponement was that it was impossible to deal with the Bills simultaneously. The County Council could not compete against any Water Company, even if they wished to do so, except in a most minute portion of the Kent Company's district.

Mr. BANBURY said he understood that it was the distinct intention of the County Council to proceed with the remaining six Bills; and he understood also that the hon. member had practically told the House that he would not use the two Bills which had already been referred to a Committee to exercise any pressure on the remaining six Companies. He understood that this was not the object at all; but that it was simply and solely because it was more convenient to take the first two Bills together.

Mr. STUART said that was so; and they were about to move for *locus standi* for the other Companies, in order that, if their interests were prejudiced in any way, they might have an opportunity of presenting their case before the Committee.

Mr. BANBURY said he was quite satisfied. It was not his wish that the London Water Companies should receive a farthing more than they ought to have.

Sir F. DIXON-HARTLAND said that, on the clear understanding which had been expressed, he would withdraw his amendment.

The motion was then agreed to; and the second reading of the other five Bills was also deferred till May 3.

A motion by Mr. STUART, referring to the Committee on the Lambeth Water (Transfer) Bill—"That it be an instruction to the Committee that they have power, if they think fit, to insert in the Bill directions to the Arbitrators to take into consideration any points favourable to either party, in addition to those specified in the Bill," was ruled out of order.

Mr. STUART moved, in regard to the same Bill,—"That any county council and any of the London Water Companies be entitled to be heard before the Select Committee on the above Bill on any petitions praying to be heard by Counsel, presented by them on or before March 4 next; and that such petitions be referred to the said Committee."

Mr. BOULNOIS said the date named would not allow the county councils sufficient time to meet; and it was desirable that they should get the common seal attached to the petitions they presented.

Mr. STUART, recognizing the propriety of the request said the desire of the London County Council was to afford public bodies directly interested every reasonable opportunity of petitioning; and he had cause for believing that an extension of the date from the 4th to the 14th of March would meet the circumstances of the case. He would therefore move that the date in the motion be altered to March 14.

Mr. BRYNE moved, as an amendment, that the words "district councils" be inserted in the motion.

Mr. STUART thought this proposal might inconveniently extend the number of petitioners. Still, the County Council would be ready to hear and consider all bodies whose interests were directly affected by either of the Bills. He could not then assent to the amendment; and he would suggest that if the hon. member conferred with him on the matter, something might be done to meet his views.

Colonel LOCKWOOD said there were certain district councils largely interested in the question, though they were not many in number. It would be unfair, however, to shut them out from putting their cases before the Committee.

Sir J. LUBBOCK remarked that West Kent was very much more interested in the question than East or Mid Kent; and it was more important for West Kent to be represented than Kent as a whole.

Mr. S. BUXTON said the proposal of the hon. member for Shoreditch was a fair one. The Committee would not assemble until after Easter, and possibly in a few days something might be done by the County Council with the view of meeting, if they could, the wishes of hon. members in regard to district councils, of which only a certain number were affected. No prejudice would ensue by the matter being postponed for a few days.

Mr. STUART repeated that the London County Council would not oppose the representation of any district council directly interested.

Mr. VICARY GIBBS then moved the adjournment of the debate until Monday, and this was agreed to.

Friday, March 1.

SOUTH METROPOLITAN GAS BILL.

On the order for the second reading of this Bill,

Mr. JAMES ROWLANDS said he fully realized the importance of his action when he proposed the rejection of a Private Bill at the stage of second reading. Of course, during debate he would be told that the Bill ought to go to a Committee, before whom all objections would be threshed out. He quite admitted the justice of this contention when opposition was grounded entirely upon points of detail; but, if there should be, in a Bill promoted by private interests, a question of public principle, then it was for the House to express an opinion upon that principle. He hoped to show that underlying the proposals in the present Bill there was a very great principle indeed; and it was for the House to seriously consider whether, in the public interest, such a principle should be endorsed. As he understood, the power of promoting Bills of this kind was given to private interests on the condition that such Bills should be in the interest of the community. Now, if by chance a Private Bill carried with it only the interest of a particular class, instead of the interest of the whole community, then he conceived it to be the duty of any member of Parliament to oppose the second reading of such a Bill. The particular Bill before the House had many points of detail; but the main point, so far as the question of second reading was concerned, was whether the House was to give to a private Company the power to do what was known on the Stock Exchange as "water its capital." He was quite aware that some members who might follow him in debate could quote instances like the Crystal Palace Gas Company and others; and he was perfectly aware that the House had given this power to private companies. But he was not aware that on any occasion the principle had been challenged in the House. He thought, however, the time had now arrived when the House should be asked if it was prepared to sanction this watering of capital in what was supposed to be the interest of a company. It would be in the mind of members that gas companies, or persons who carry on gas undertakings, were under ordinary market competition. But this, so far as London was concerned, was altogether a secondary matter; and he had the authority of the Chairman of the Company interested in the promotion of this Bill—he had his strong assertion—that, so far as the Gas Companies of the Metropolis were concerned, there was no competition at the present time, but, on the contrary, there was an absolute monopoly. He fully realized the position Mr. Livesey held in the gas world; and not for a moment did he wish to underrate the unique ability he had shown in the direction of his undertaking. But, in a lecture delivered at New Cross some few months ago, Mr. Livesey dealt with the extent and growth of gas companies' undertakings; and he then laid it down that, since 1859, there had been no such thing as competition—that companies had given over all competition, because of the result of what he called "suicidal policy." So, on the admission of Mr. Livesey himself, the House in dealing with a gas company had to deal with a monopoly; and it was for the House to consider whether it would allow this "watering of capital" proposed in the Bill. The Bill was supposed to be a very simple one indeed. It just asked the House to convert, roughly speaking, its capital of £2,000,000 into £4,000,000; and, as a set off, to reduce the statutory dividend from 10 to 5 per cent. But underlying all this there was a much greater question; and he thought the whole question of capital, so far as the market was concerned, would be affected by the action proposed to be taken on this Bill. What was the history of the Bill? There was at one time a possible reason, from the promoters' point of view, for bringing the Bill before the House; but that reason had disappeared. If there had been only a question of altering the capital, leaving the relative proportion of dividend to capital the same, then there would be no reason to ask the House to alter this factor. But those who had studied the action of the South Metropolitan Gas Company—and he presumed that some members had studied it—would be aware that, at the present time, the reason for promoting the Bill was not simply a question of the multiplication of capital, and the division of interest. The Bill undoubtedly sprang out of the ingenuity of Mr. Livesey; because he had a distinct reason for promoting it. He desired to develop into another stage his own ideas with regard to the relations of capital and labour—ideas which he had carried out in his profit-sharing scheme; and Mr. Livesey, rightly or wrongly, thought it would be to the interest of the labour world that, having put his profit-sharing scheme into operation, facilities should be given for placing one or two representatives of the workmen on the directorate of the Company. This was impossible under the existing constitution of the Company; and hence the promotion of the Bill. Undoubtedly the Bill was promoted with the object of carrying out Mr. Livesey's idea. The benefit or not of that proposal to the workmen, he would not now discuss, as the clause Mr. Livesey desired to insert, to carry out his purpose, had been dropped—not, it should be said, from any fault of Mr. Livesey himself. It was a clause which would have allowed him, after submitting his scheme to the approval of the Board of Trade, to have placed workmen representatives on the directorate, with a lower qualification than was demanded from the ordinary stockholders of the Company.

Mr. KIMBER: There is nothing in the Bill on that subject.

Mr. ROWLANDS said he was quite aware of that; but he was dealing with the history of the Bill, and was within his right in doing so. He had read the account of the proceedings at the recent annual meeting

of the Company; and he shared the disappointment of Mr. Livesey at the loss of his proposal. Mr. Livesey explained his scheme in a manful way. But his co-Directors would not have it; and, in their action, they were backed by a majority of the shareholders. Whatever reason there might have been for the promoters to have tried to introduce into the labour or industrial world this new principle of bringing working men on to the directorate of a big corporation, that reason immediately disappeared when the directorate would not have the principle. No one who had considered the matter, however, would deny that this was at the bottom of the inception of the Bill, and not the financial proposals therein. The promoters would, of course, make the most they could of the advantages that were given to the consumers; and doubtless they would ask: Did he understand the auction clauses and the sliding-scale charge? So far as a layman could have mastered the question—and as one having no interest in any gas company he had only studied the subject from the point of view of his public position—he understood fairly well both the action of the sliding-scale and of the auction clauses. The statutory dividend of the Company was 10 per cent. on a standard of 3s. 6d. per 1000 cubic feet; but under what condition in 1876 was this arranged? It was given at that time, because it was believed that in allowing what in these days was considered an outrageous dividend of 10 per cent. on capital invested, there would have been some need for competition on the part of the Company. Experience all round in the gas world had shown these statutory standards were ridiculously high. Take this or another Company in London, and experience showed the standard price was ridiculously high. The House was now asked to re-affirm the statutory dividend of the Company; and those who opposed the Bill were not responsible for the opening of this question. The Company had its powers; and, if satisfied to go on under existing conditions, it had statutory right to do so. But when the Company asked the House to change the present condition of the concern, it also asked the House to re-affirm its statutory standard given 1876. By clause 15, it would be seen that, by the action the Company were now taking, the whole question of the condition of the concern was put before the House. He would not follow details in regard to the profits of the Company, for he had the intention of moving an "Instruction" to the Committee, should the Bill be read a second time, which would raise the whole question of the earning power of the Company. Clause 15 stated that the standard price of gas should be 3s. 6d. per 1000 cubic feet, "subject to provisions hereinafter contained." So that the Company put the whole question before the House for consideration. It would be said that, if the Bill passed, consumers would be thoroughly protected, because of the working of the auction clauses. But what was the working of these clauses? When did the auction clauses come into existence? How much of the capital of the Company had been submitted to these clauses? The auction clauses were a mere provision of Parliament, and had had a very beneficial result; but, out of the £2,000,000 it was sought to convert into £4,000,000, how much had been submitted to the auction clauses? Not more than £800,000. The bonus, therefore (he spoke from memory), on the last returns was £200,000. He did not dispute the usefulness of the clauses; but the Bill dealt with the whole of the capital, putting all in the same advantageous position—every £100 being converted into £200 face value, so far as the public was concerned. He might be met with the remark that this was quite true so far as the past was concerned; but there was more capital which had to be submitted to the auction clauses. He admitted this; and the gross sum was £600,000—not £600,000 to be put on the market to realize all that was possible, but only such a sum as would realize with the profit of the auction clauses £600,000 of capital. If the Bill dealt only with the capital that had been submitted to the auction clauses, or that which had to be submitted to those clauses, there would be a stronger case for the promoters' position. But the Bill dealt with the whole of the capital provided by the series of Companies now known as the South Metropolitan Company. He would not go into the question of the conversion of stock to any extent; that was a larger question for the stockholders themselves. He judged by his reading of the JOURNAL OF GAS LIGHTING that some were not very well satisfied with the terms they got. One gentleman in that paper the other week said it was a very important question to him—that holding stock he did not get the benefit he ought to; because, he said, by proceeding with the Bill, dividends would be affected, because Parliament would demand some ransom for passing the Bill. What ransom did the promoters offer? None. The phrase was not his; it would be found in the language of one of the large stockholders of the Company. Having eliminated from the Bill what he considered the real reason for its promotion—the question of working-men directors—what was the object of its being put forward? It was that the sale of stock might be facilitated by the conversion of the different stocks into one single stock. Possibly this was so; he would not dispute it. But did the promoters come to Parliament for this purpose? Looking at it from a public standpoint, and speaking for the consumer so far as he could, this conversion of stock gave double the nominal value to all stock subscribed to the Company—every holder of £100 having that converted into £200 by legislation. (No, no.) With the exception of the auction clauses—leaving that portion out—the face-value of the stock would be doubled. Supposing that, with a change in the conditions of lighting, this stock should recede to something approaching its original value, the persons who bought of the present holders would consider they had bought the capital values on the face of the stock; and if at any time a local authority should want to buy, what would be their position? They would consider there was some system of confiscation introduced if they did not get full face-value for the stock they had bought at the particular price sanctioned. It was unwise for the House to intervene in transactions of this kind. He admitted, and the Company must admit, that they had obtained good terms from Parliament. They had reaped a good profit; and whether a person liked to pay down on a given undertaking that was returning, say, 5 per cent. (this Company were paying 13 per cent.), whether or not it was a question of his paying that down at 2 per cent., should be left to the individual who bought. Parliament should not interfere, and say that 13 per cent. was too high on account of the price given in the market. The stock did not pay 13 per cent. to the present holders, but only 6½ per cent. This should be left entirely to the market. The promoters had issued some reasons in support of their Bill, and had chided him for not giving similar facilities to the House for appreciating his opposition to it. This was a reasonable complaint. But he was simply in the position of a private member trying to do his duty; and he had not at command resources to allow him to issue a document of this description. He could only ask members to listen to his statement. The promoters had given reasons for passing the Bill. In the first place they stated: "It is well known that the market value of a consolidated stock is greater than the market value of the separate stocks before consolidation"—a statement he did not dispute. "The Company, therefore, by consolidating their stocks will be able to obtain a greater premium for the stock they still have to issue, and so benefit the gas consumers." He admitted that on the £600,000 to be issued; but if the statement was true, what was the present made to the persons who held all the rest of the stock issued before the conversion took place? On the statement of the promoters, the moment the stock was consolidated, there was a very nice bonus handed over to the holders. If that was the fact, then what were the gas consumers going to get, and where would be the public benefit? In their next paragraph the promoters said: "The power to enable gas consumers and those in the employment of the Company to buy any unissued stock of the Company (when issued) at the then market price of the stock of the Company, would give both consumers and the servants of the Company an interest in its prosperity." Possibly; and a very laudable idea to give consumers and employees a chance of getting hold of the stock. Then let them buy the present stock; it was only a question of price. Let them buy at a lower price. Do not consolidate it, getting the highest possible price in the market. That was not in the interest of the small consumers or the workmen in the employ of the Company. He had dealt with this as a grave question, whether Parliament should give to the Company the power of watering its stock in the way asked; and he appealed to the President of the Board of Trade to consider—in all earnestness, and from a public standpoint—whether it would be for the benefit of the community to allow the change to be made. He had not gone into the question of dividends, or what the Company might have paid during its long existence. These points would fairly arise upon the "Instruction" to the Committee which it was his intention to move. He had mainly devoted himself to the principle underlying the Bill; and he asked the House, for the reasons he had given, and particularly as the principal reason why the Bill was promoted was now outside its scope, to reject it in the interests of the public. He concluded by formally moving that the Bill be read a second time six months hence.

Mr. BANBURY said he would not follow the hon. member into the discussion he had raised, but would shortly state the true object of the Bill. The hon. member said that it was only in the interest of a particular class, instead of the whole community; but he did not seem to understand the effect of the Bill. There was three classes of stock—"A," "B," and "C;" and it was proposed to consolidate these into one stock, and to reduce the dividend from 10 to 5 per cent. as the statutory dividend, and at the same time to double the stock. The effect would be that the dividend would remain exactly the same in amount—the Company gaining no advantage whatever as regarded dividend or capital. The capital, of course—the value of the stock in the market—would be divided by half; ordinary stock, standing (say) at 300, would, if the Bill became law, stand at 150. The hon. member was under a delusion in supposing that the capital would be increased. Possibly the new stock would command a rather higher premium in the market; but that would be an advantage to the community. There was an amount of some £600,000 or £700,000 of fresh stock to be issued by auction. It was evident that, if there was a wish to raise £15,000, and stock stood at 150, there would be need to issue £10,000 of stock to obtain £15,000. This being so, in the event of the London County Council buying up a public company, they would have a less nominal amount of stock to buy than if £15,000 of stock were issued. In this way the capital of the Company would not be increased. When the new stock was issued, they would obtain a larger amount of stock with a smaller amount of capital than under the present system. So that, in the event of the County Council, or any other local body, acquiring the undertaking, the amount of the nominal capital to be dealt with would be smaller if the Bill became law. This would be evident to any man of business. Then the hon. member talked about "watering" stock—adopting that as a Stock Exchange phrase. But he could not have quite understood it. "Watering" stock was issuing new capital which would rank for additional dividend; thus reducing the dividend the existing holders received. In the present case, the dividend was not touched; and if the stock was "watered," then so was the dividend. The statutory dividend would be reduced from 10 to 5 per cent. Supposing it to remain at 10 per cent., there might be something in what the hon. member had said; but as the statutory dividend was to be watered too, the argument failed. Then the hon. member said something about a certain portion, not the whole, of the capital being sold by auction. But this had nothing to do with the case. The capital would remain the same whether the Bill passed or not. There would still be an amount to issue by auction, and a certain amount not so to issue. The nominal amount of capital would always remain the same in the event of purchase by a local body. These were the only points he need deal with. The effect, if any, to the consumer would be to his advantage, because it would enable the Company to borrow money on better terms; and the shareholder would have a better market for his security. If this Bill did not affect the consumer in any way, or the purchasing authority, should ever wish to take over the concern, then he failed to see the ground of the hon. member's objection to it.

Mr. HOWELL thought the hon. member who had just spoken, if he had said anything at all affecting the Bill, had shown that it was unnecessary; that it would not change the actual condition of things; and that there was no earthly reason why the Bill should have been introduced. The ostensible reason for promoting the Bill had been abandoned by the Company. He would not say a word in reference to the Chairman of the Company, who seemed to be desirous of carrying out the intention he had expressed. In that intention, however, he had not the support of his co-Directors or the shareholders of

the Company. It would seem then that, if any reason had existed for the Bill, that reason was absolutely gone. When the hon. gentleman seemed to intimate that his hon. friend the member for Finsbury did not understand the question, it opened a doubt whether the hon. gentleman had himself read the Bill. He (Mr. Banbury) wanted to show that the Company would not be changed in regard either to capital or dividend; but if there was to be no change, why on earth should the House be troubled with this juggling of finance, or the Committee upstairs? In one of the reasons set out by the South Metropolitan Gas Company, the object of the Bill was stated to be "to convert the capital of the Company entitled to the said standard 10 per cent. dividend into double the nominal amount to be entitled to a standard rate of dividend of 5 per cent.," being half the present standard dividend—exactly to double the amount of the stock. Every holder of £100 stock in the Company would, after the passing of the Bill, hold £200. (No, no.) That was so; but instead of getting 10 per cent. on £100, he would get 5 per cent. on £200. Nominally, then, he would remain in the same position, so far as the shareholder was concerned. But there was something behind all this. Ten per cent. in the present state of the Money Market looked a large sum; and there were few business companies that could afford to pay 10 per cent. This Company was paying 13 per cent.; but taking it on the reason given by the Company, by converting £100 into £200, and giving 5 per cent. instead of 10 per cent., the transaction was given a reasonable appearance. Certainly it was fair and reasonable that a shareholder should get 5 per cent. for his money. But when the London County Council, or any other local authority, came to the House with a proposition to buy up the Company, and the House declared in favour of the proposal—as he hoped the House would—then the authorized 10 per cent. dividend would look such a very large sum, that the Select Committee would be very careful in considering whether the basis of purchase should be upon such a large dividend, considering the possibility of competition in the future by electric lighting. But when they came modestly before the Committee with a 5 per cent. dividend only—the shareholders' capital having been doubled by the action of Parliament—then the modesty of the proposal might induce the Committee to pass it. He felt, in regard to this, that a Committee should not be called upon to deal with the principle enunciated in the Bill and set forth in the "Reasons." Private Bill Committees should be protected. That the House owed a debt of gratitude to those Committees, he freely acknowledged; and he would have protected from any taint of corruption, and would not impose upon the Committees the duty of dealing with such delicate matters as the Bill raised. The principle of the Bill being sanctioned by a second reading, the Committee could only see that the arrangement proposed was fairly and honestly carried out. Of the honesty and capacity of the Committee he had no doubt; but he insisted that the House itself should keep a very tight hand on the character of the Bills referred to its Committees, and the House would do well to reject this Bill. There was no earthly reason for the Bill, for the promoters had themselves abandoned the only cause for its introduction. The Directors and shareholders could not agree with their Chairman. Much cheap patriotism was going about at the present time. Such was the agreement of the Directors to Mr. Livesey's proposal. They accepted the principle as right and proper—the principle of having workmen representatives on the directorate, and that employees of the Company should have facilities for buying stock. They approved of this on principle; but, so far as he was concerned with the interests of workmen, he would say, "Thank you for nothing." They agreed to the principle; but its application was another matter. They could see no chance whatever of its being applied. There were difficulties in the way. The Directors did not agree, the shareholders did not agree, and the public buying stock might not agree; and consequently, although the principle was exceedingly good, there was no way whatever of giving effect to it. This was an example of cheap patriotism in coming to the House and asking parliamentary sanction to the provisions of the Bill, when the original intention upon which the Bill was projected was not by any means carried out. He had pleasure in seconding the motion for the rejection of the Bill.

Mr. KIMBER, whose rising was met with cries of "Divide," said he did not know whether the impatience shown was with those who approved or opposed the Bill; but he hoped, in fairness, he would be allowed to say something in its favour. He had listened carefully to Mr. Rowlands' speech, to find out on what principle fairly arguable the motion for the rejection of the Bill on the second reading was based. The last hon. member dealt with a number of topics somewhat wide of the mark; but reasons against the Bill were difficult to discover. There was one put forward, which, if well founded, might justify opposition—that a monopoly in favour of the Company would be established. Now, if in 1895 the long discussions of 1845 and 1847 upon gas monopolies were to be re-entered upon, this would lead to a review of all legislation relating to these Companies. The Bill did not established any monopoly; and this Gas Company in particular had no monopoly. Ever since the auction clauses and the sliding-scale were introduced, the Company had been in partnership with the public—the public sharing in its prosperity. He spoke solely from a public point of view, having not a penny invested in the Company, or any pecuniary interest in it. The hon. member who seconded the motion for the rejection of the Bill spoke of his friends the working men and of the shareholders getting 10 per cent. With regard to the 10 per cent., the shareholders of the Company and every purchaser of £100 stock did not get anything like this return. The "C" stock of the Company stood at present at 309 for every nominal £100. Would the proposal in the Bill benefit the working man or not? Examination would show that the Bill was probably one of the best friends of the working man ever brought before the House. Mr. Livesey, the eminent Chairman of the Company, who for single-mindedness of purpose and for friendship to the working classes had no superior, and whose Company was the pioneer of cheap gas-and the profit-sharing principle, had given proof of his fairness and of his interest in the working man at least equal to so-called "friends of the working man."

Mr. HOWELL: It is not provided in the Bill.

Mr. KIMBER said there was a portion of the Bill which neither of the hon. gentlemen who had spoken in opposition appeared to have read. The Bill provided that the three classes of stock into which the capital of the Company was divided (the whole of which was paid up) should be unified; and by the unification the stock would no doubt become more valuable. He was at a loss to know why the shareholders in a joint-stock undertaking were not to get any natural improvement in the value of their property by an operation which injured nobody. Besides unifying the stock—or what the hon. member called "watering" the stock, though it was nothing of the kind—they proposed to take the stock at £200 instead of £100; and it mattered not what the stock was called, for this did not fix the market price or the intrinsic value. When a man bought the stock, he had £200 instead of £100; but the stock he obtained would have the same value in the market. No harm was done to anybody. It had always been the practice of the House to allow joint-stock companies—and to this much of the success of joint-stock enterprise was due—to arrange their capital in this way. The hon. member who moved the rejection of the Bill found something very secret in this financial transaction. He began a history of the Bill, and said it had its origin in a clause which was not in it now—a clause proposed by Mr. Livesey for a really beneficent object, giving the representatives of the employees seats on the Board. That was an object which hon. gentlemen opposite, if they were really friends of the working man as they claimed to be, would be glad to see secured. But the hon. member was a little contradictory; for he said that, inasmuch as the Bill did not contain the clause, it was not friendly to the working man. It was, he said, nevertheless the foundation of the Bill; and Mr. Livesey was endeavouring to get in the "thin end of the wedge" to attain his other object. If the object was a good one, why not support the Bill? The thin end of the wedge would be found at the end of the Bill, in the schedule. This gave power in future for the stock to be divided and transferred in small sums, and conferred voting power so as to enable any thrifty working man who could save £5 to become a partner, and have a vote at the meetings of the Company—a good object, surely. Then farther on, in the schedule, would be found the means by which the Company, at its own expense, and to save trouble to the poor holders of stock, and the expense of a stamped deed and all formalities, took from their workpeople a simple direction as to the person upon whom after death the stock should devolve; thus enabling the stock to be dealt with after death, with the dividends thereon, and also any money derived from the profit-sharing system, applying this in an inexpensive way among the relatives or appointees of the working men. Supposing the Bill did not contain these provisions, and only the clauses as to capital, it still was justified, and should be sent to a Committee. There was power to issue £600,000, not of new capital, but of capital already sanctioned. As a fact, this so-called "watering" would benefit the public. The stock would be unified in character; it would be in one volume with other stock; and it would get the benefit the market always gave to a large and unified volume of stock. They would get a much larger sum of money for a much smaller amount of nominal capital. When the £600,000 of capital was launched, it would be offered at the market price to the workmen and consumers of the Company, who would have the "first pull," and would only pay the market price. The nominal dividend was 13 per cent.; but nobody got stock paying this interest. It paid the purchaser about 4½ per cent. This £600,000, of which the consumers and employees would take their pick, would go to auction; and the capital represented by that, which would probably be at the rate of 300 per cent. would go to the Company. It would not pay 13 per cent., but calculation would show it to be a little over 4 per cent. He trusted the Bill would be allowed to go to an ordinary Committee.

Mr. BRYCE (the President of the Board of Trade) thought, as the House evinced signs of impatience, it might be as well for him now to intervene with a few words. His hon. friend (Mr. Rowlands) had given long and careful attention to gas questions; and, with no small benefit to the public, had devoted himself to the examination of these Bills. He was justified in calling attention to some of the provisions of the Bill on the second reading stage. The points, however, upon which the discussion had almost entirely turned were as to the financial effect of the proposed changes—whether or not there would be any benefit to the consumer or to the public, and, if so, how much, and what benefit to the existing shareholders. The House must have found difficulty in following the arguments, though some—and notably those of the hon. member for Peckham (Mr. Banbury)—were put lucidly enough. Probably, however, the House had not apprehended exactly what the effect of the Bill would be. He did not see, in any details raised upon the financial question, that any matter had been shown adequate for the rejection of the Bill. In the absence of the Chairman of Committees, whose voice was usually heard on these matters of procedure, he felt bound to say this. These points in a Bill of financial detail, or of construction in the case of Railway Bills, were questions invariably sent for the discussion of Committees upstairs. He did not see that any consideration had been shown for departure from ordinary practice. There was no ground for distrusting the ability or impartiality of any Committee to whom the Bill might be referred. The hon. member (Mr. Howell) said the House should be a scrupulous guardian of the impartiality of its Committees; but certainly questions equally difficult, and quite as severely testing impartiality, were often submitted to Committees without any doubt. He hoped, therefore, that the Bill would be allowed to go to a Select Committee. Something had been said by the hon. member for Finsbury about "watering" stock; but he could not assent to that argument. It did not appear whether or not the effect of the Bill would be to benefit the shareholders; but he believed it would, as the hon. member for Peckham admitted. However, whether that was so or not, certainly it was not a case of watering stock. That principle did not arise. One principle did arise in the Bill, which seemed to be a ground why the mover of the motion was warranted in drawing special attention to the Bill. These gas companies held their powers and made their dividends under parliamentary title; and when they came to the House asking for a re-arrangement of their financial concerns, they naturally obtained incidentally from the House what might be in fact represented as a reassertion and confirmation of their parliamentary title. There had been complaints from consumers as to the title under which companies made their dividends; and these complaints were in spite of the sliding-scale, under which the companies were only allowed to increase

dividends in return for cheapening their supply. These complaints arose more in the case of the Companies of North London than of this Company. The hon. member would remember that he headed an influential deputation about six months ago from Vestries in the North of London, and stated their case against The Gaslight and Coke Company—at the same time holding up the South Metropolitan Gas Company as comparatively a model or example of what such a company should be. He said they gave a better supply of gas at a lower rate than the northern Company. On that occasion, the deputation suggested an inquiry into the matter; and he understood that since then the North London Vestries had agreed to memorialize the House in favour of inquiry by Committee. The hon. member had not referred to this; he had not intimated if that was so, or not.

Mr. ROWLANDS said he expected to be authorized to move in the matter in a few days.

Mr. BRYCE said, if the hon. member intended to do this, it appeared to him that such questions as he had now raised would have to come before such a Committee. It was therefore not necessary to raise them here, or to take a division against the Bill. With this general inquiry in contemplation, his hon. friend, if he would take a word of advice, would do well not to divide the House. There was always a certain risk of the case to be presented to a Committee being prejudiced by the result of a division in the House. Having done his duty by calling attention to the subject, perhaps his hon. friend would be content to allow the Bill to proceed.

Mr. ROWLANDS said, after the statement of the right hon. gentleman in regard to the inquiry into the whole gas question, he felt that he had done all he desired to do now; and therefore he would withdraw his motion.

The motion was then, by leave, withdrawn; and the Bill was read a second time.

The following progress was made with Bills last week:

Standing Orders complied: British Gaslight Company (Staffordshire Potteries) Bill.

Bills read a second time and committed: Bridlington and Quay Water Bill, Brymbo Water Bill, Chelsea Water Bill, Hayward's Heath Gas Bill, Lambeth Water Bill, Newmarket Gas Bill, North Middlesex Gas Bill, Scarborough Gas Bill, South Metropolitan Gas Bill, Whitby Water Bill, York New Water Bill.

Petitions have been presented against the following Bills: Bray, &c., Water Bill, Brighouse Corporation Bill, Chelsea Water Bill, Chelsea Water (Transfer) Bill, Clonmel Corporation Bill, Croydon Corporation Bill, Lambeth Water Bill, London County Council Water Bills, North Middlesex Gas Bill, Scarborough Gas Bill, South Metropolitan Gas Bill, York New Water Bill.

Petition withdrawn: Corporation of Scarborough against the Scarborough Gas Bill.

Reductions in Price.—The Directors of the Reading Gas Company intend, at an early date, to reduce the price of gas by 2d. per 1000 cubic feet, which will represent a concession of £2600 per annum to the consumers.——As from the commencement of the year, the price charged by the Merthyr Tydfil Gas Company has been reduced from 3s. 4d. to 3s. per 1000 cubic feet in the town district, and from 3s. 8d. to 3s. 4d. in the out-districts; gas employed for other than lighting purposes, and supplied through a separate meter, being charged at 2s. 10d.—all net prices.——The Directors of the Leamington Gas Company announce a reduction of 1d. per 1000 cubic feet, to take effect as from Christmas last; making the price 2s. 6d.——The Ripley Gas Company have decided to reduce their price 3d. per 1000 cubic feet as from the 1st prox.——A reduction will be made in the price of gas at Rugby as from the 31st inst.

The London County Council and the Repayment of the Proposed Water-Works Purchase Loan.—At the meeting of the London County Council last Tuesday, the Finance Committee presented a report in which, on the suggestion of the Water Committee, they recommended that the Parliamentary Committee be instructed to take the necessary steps to obtain authority, in the Council's Money Bill, for the period of 100 years being allowed for the repayment of any moneys borrowed for the purchase of the Water Companies' undertakings. They pointed out that the term of repayment for Council loans had hitherto been 60 years; but they thought in an expenditure of such magnitude as the purchase in question would involve, it was probable that Parliament would relax the Standing Orders so as to allow a longer period, especially as in many cases provincial towns had been allowed to spread the repayment of the cost of their water supply over terms extending to 100 years. The report was adopted.

The Kingston-on-Thames Town Council and the Water Supply.—The Kingston-on-Thames Town Council have resolved to petition against the Lambeth Water-Works (Transfer) Bill. The Bill provides that if the London County Council succeed in taking over the undertakings, the urban districts through which the mains pass shall have the right to give six months' notice to take over such part of the mains as run through their districts. But the Kingston Town Council consider it unfortunate that there is a provision which stipulates that, with regard to the whole of that part of Surrey which is within the jurisdiction of the Surrey County Council, they shall have no right whatever unless they obtain the sanction of the Surrey County Council under their corporate seal. This is one point upon which they wish to protect themselves. With reference to the recent severe weather, the Town Council lately applied to the Lambeth Water Company for the payment of the expense which they have been put to in distributing water by means of water-carts in the district. The Company replied that they were doing their best to cope with most exceptional circumstances, and were incurring a very heavy additional cost each day. They were "utterly at a loss to understand on what ground the Corporation expected to be recouped expense which they have incurred on their own motion." The Council are rather indignant with the Company; and the Town Clerk has again written to the Directors, expressing his belief that, on reconsidering the matter, they will admit the justice of their claim.

MISCELLANEOUS NEWS.

THE BOARD OF TRADE REPORT ON THE GAS, &c., BILLS AND ORDERS OF THE PRESENT SESSION.

The Board of Trade report on the applications for Gas, Electric Lighting, and Water Bills and Provisional Orders for the present session has been issued. It shows that the number of Bills relating to the supply of gas is 16, of which 13 are for England and 3 for Ireland. Six of these Bills contain provisions in regard to the supply of water; and one, authority for electric lighting. The capital proposed to be raised is £913,000—£445,000 by shares, and £468,000 by loans. There are 24 Bills relating to the supply of water—one being Scotch and one Irish. The total capital asked for is £2,594,700—£543,000 by shares, and £2,051,700 by loans. Provisional Orders to the number of 11 have been applied for in respect of gas and water, and 29 in regard to electric lighting schemes. The capital proposed to be raised under these Orders is: Gas, £100,000; gas and water, £9000; water, £50,875; electric lighting, £551,588. Compared with last year, the number of Gas Bills is reduced by three; that of Water Bills, increased by two—the total for the two classes of Bills being now 40, against 41 last year and 36 in 1893. The capital required for gas purposes is £461,200 less, and that for water purposes £1,227,790 less, than last year. For Gas and Water Orders the capital proposed is £184,618 less, and for Electric Lighting Orders £148,618 more than in 1894. The applications for the last-named Orders show an increase of three, as compared with an increase of eight last year.

THE EXPLOSIONS IN ELECTRIC LIGHTING BOXES.

The Cause Discovered.

The following letter on the above subject has been addressed by Sir Courtenay Boyle, the Permanent Secretary of the Board of Trade, to the Chairman of the Electric Lighting Committee of the St. Pancras Vestry:—

Sir,—Adverting to the interview which you were good enough to give me yesterday [Feb. 27], and to the conversation which we had on the subject, I am directed by the Board of Trade to state, for the information of the Electric Lighting Committee of the St. Pancras Vestry, that Major Cardew, the Electrical Adviser of this Department, has discovered, in his investigations into the recent explosions in the street-boxes used for electrical supply in St. Pancras, that a remarkable deposit on some of the insulators contained a considerable quantity of the metal sodium. The presence of this metal, which is highly inflammable by contact with water, appears to be so grave a source of danger, and to afford so reasonable an explanation, in connection with the accumulation of escaped coal gas, of the several explosions which have recently occurred, that it devolves upon the Board of Trade, without any delay whatever, to investigate the causes of the deposit of this substance with a view to its prevention; and in the investigation they have asked for the assistance of the Royal Society and of the Institution of Electrical Engineers. In the meantime, in order to prevent as far as possible the recurrence of similar explosions, the Board of Trade would strongly urge that the Vestry, through their Electrical Committee, should immediately (1) provide a thorough system of ventilation for their conduits and street-boxes; (2) reduce, as far as possible, the space in their street-boxes within which an accumulation of gas can occur; and (3) make a thorough inspection of their mains, and remove the above-mentioned deposit wherever it is found to exist. As regards the means to be taken for prevention of the recurrence of such deposit, the Board of Trade hope to communicate with you further without delay.

In reply to this letter, Mr. A. E. Pycraft, the Chief Clerk of the Electricity Department of the Vestry, expressed the Committee's appreciation of the courtesy shown by the Board of Trade in endeavouring to assist them in preventing a recurrence of the explosions referred to, and stated that they had given instructions to their Engineer to take steps without delay for getting rid, by means of ventilating-pipes, of any accumulation of gas in the manholes and culverts, and to reduce the size of the former. He added that the Committee hoped the Board would bring pressure to bear on the Gas Company to remedy the defective state of gas mains and services in the Vestry's district, and thus remove the primary cause of the explosions.

TOTTENHAM AND EDMONTON GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Saturday week, at the Offices, Willoughby Lane, Tottenham—Mr. GEORGE GRIPPER, J.P., in the chair.

The SECRETARY (Mr. James Randall) read the notice convening the meeting; and the Directors' report and the accounts, some particulars from which were published last week, were submitted.

The CHAIRMAN, in moving the adoption of the report, said it was, in the opinion of the Directors, a very satisfactory one. They certainly had made a considerable improvement in the past half year; the increase in the quantity of gas sold having been 7·30 per cent. over the corresponding six months of 1893. In that period there was a decrease of 2 per cent.; so that they had made an immense advance in the business. The Directors had therefore felt warranted in proposing a reduction of 1d. in the price of gas from Lady-day next. The policy of the Board was to produce and sell gas at as low a figure as they could—giving, as far as possible, every advantage to the consumer, while not losing sight of the interests and profits of the shareholders. Although the Directors proposed to make a reduction in price, they did not say anything about an increase of dividend, because they felt they would not be justified in doing so in their present state. They had transferred £500 to the insurance fund; and after paying the dividend,

there would be £1682 to carry forward. The reduction of 1d. represented about £1200; but they hoped the increase in the business that was now going on would recoup the whole of that. The Directors were treating the public as liberally as they could; and therefore he asked the shareholders to deny themselves any further dividend for some little time. Alluding to prepayment meters, he said that the rapidity with which these had been taken up had astonished them. They had at the present time 1280 or 1290 prepayment meters in use, which was very little short of the number The Gaslight and Coke Company had fixed; and they had applications for between 300 and 400 more, which their Engineer (Mr. W. H. H. Broadberry) would fix as soon as he could obtain them. He regarded this as a very important feature in the future of the Company. This brought him to another matter. As he had said, they had made a 7½ per cent. increase in the past half year; and the growth of the business, of course, necessitated the outlay of capital. They had completed the new water gas plant; and they were going to raise capital to pay for it, and for new purifiers and mains, which would have to be provided during the summer. They had decided to issue £20,000 of "C" stock in March, which would carry them on for a little time. Unfortunately, however, the expenditure of capital was always followed up by the dividend accruing thereon. The only other point which required attention was the loss, which they deplored very much, of their colleague Mr. Joseph B. Doe. At their last meeting, they had Mr. Doe as a new Director; and, at this meeting, they had another new Director. Mr. Doe, whose death occurred very suddenly, was a diligent member of the Board. They had elected Mr. Henry Bailey to fill the vacancy; and he (the Chairman) believed they had made a wise selection.

Mr. CORBET WOODALL seconded the resolution. He remarked that he was sure it was a matter of gratification to all the proprietors to see the announcement in the report that the Directors were in a position to recommend not only the payment of the ordinary dividends, but also to promise a reduction in the price of gas. They had during the last few years, he might say, rather plumed themselves upon the fact that they had not had to increase the charge to the consumers. The tendency all round them had been to raise the price, because of the increase in the cost of coal and labour. In their own case, they had not done that; and now they were in the happy position of being able to reduce the price. The reduction was a small one; but the feeling of the Board was that better by all means give a small reduction when they saw their way clear than keep the consumers without until they were able to make a large one. He did not think—unless, of course, they were very much disappointed in their expectation—it would be long before they were able to propose a further reduction; the condition of the Company being eminently satisfactory. He was noticing that, in the corresponding report to the one now before them, the Directors announced a considerable increase in the revenue from the residual products; while now they had to submit accounts which showed that, although the consumption of coal had been about the same as this time last year, they had a large falling off in the revenue from the residuals. But there had been a saving in the expenditure for coke and oil (which now entered largely into the cost of manufacture); and this saving more than balanced the loss on the residuals. In addition to this, they had a satisfactory increase in the gas revenue. The balance showed an improvement of something approaching £2000, as compared with the amount available this time last year; and out of this they were returning to the consumers about £1300 by the penny reduction. In the corresponding period of 1893, they did not fully earn the dividend, and had in consequence to draw upon the undivided balance; but on this occasion, they were not only able to reduce the price, but to add slightly to the undivided balance.

Mr. HALL, referring to the proposed conversion of the capital of the South Metropolitan Gas Company into 5 per cent. stock, said it appeared to him to be a wise step to take. It would not only show more clearly the interest the stockholders were receiving for their money, and make the stock of more value, but it would put them in a better light before the poorer section of the public, who only obtained 2½ per cent. upon their savings, and who thought gas shareholders were getting 11, 12, and 13 per cent.

Mr. H. D. ELLIS inquired whether 11½ per cent. was the statutory dividend at the price of 3s. 2d. per 1000 cubic feet. [The CHAIRMAN intimated that it was.] Proceeding, Mr. Ellis congratulated the Board upon the accounts. With reference to the reduced return from the residual products, he hoped the shareholders would not attach too much importance to that; for, after all, the result from products was a secondary matter. The primary business of the Company was to push the sale of gas; and this they had done with great success. The increase of 7½ per cent. in the consumption was very gratifying indeed. The market for bye-products was a fickle and shifty thing; and it depended upon a variety of circumstances, which the Board could not help or control. He hoped the anticipation that the Directors had formed as to the increase of the business, when they had more capital to put into the concern, would be amply realized.

The CHAIRMAN, in reply, said they perfectly agreed with Mr. Ellis that the residual products were subsidiary to their gas business; but at the same time they came in very conveniently, and they must not lose sight of them altogether. With regard to Mr. Hall's observations, they would not be in a position until they went to Parliament again to entertain his proposition; but it was a matter that had not escaped the attention of the Directors.

The motion was unanimously carried.

Sir HENRY CARTWRIGHT then proposed the payment of dividends, less income-tax, at the rate of 11½ per cent. per annum on the "A" stock, and 8½ per cent. on the "B" and "C" stocks. He expressed satisfaction that the dividend had been fully earned in the half year.

Mr. CROWNE seconded the motion, which was agreed to.

On the proposition of Mr. WOODALL, seconded by Mr. WALTER LOW, a sum of £50 was voted, out of the money available for dividends, towards a fund which the District Council and Board of Guardians of Tottenham had opened for the relief of the distress which prevailed in the district through the recent severe weather—£35 to go to Tottenham and £15 to Edmonton.

A vote of thanks to the Chairman and Directors and the officials closed the proceedings.

CROYDON COMMERCIAL GAS AND COKE COMPANY.

The Half-Yearly Meeting of this Company was held last Wednesday, at the Offices, Katharine Street, Croydon—Mr. CHARLES HUSSEY, J.P., in the chair.

The SECRETARY (Mr. W. J. Russell) read the notice convening the meeting; and the Directors' report and the accounts, which were summarized last week, were taken as read.

The CHAIRMAN, in proposing the adoption of the report and accounts, first referred, in regretful terms, to the death of Mr. Alfred Twentyman—a gentleman who had been connected with the Company for a good many years as a shareholder, and for 21 years as an Auditor. Proceeding, he said that since the last meeting they had done nothing sensational; but some important changes touching the interests of the Company had taken place. It would be seen by the report that they had converted the whole of the "A" and "B" capital into stock. Besides this, they had disposed of a large amount of debenture stock; and he thought, when he mentioned what this had realized, it would be considered a most satisfactory transaction. Some few years ago, before he joined the Board, they issued 4 per cent. debentures—some at par, and some a little above—which were redeemable in four or five years. When he and Mr. Rigby were elected to the Board, they, with the other Directors, considered it would be much better if they extended the length of time, by which means they believed they would obtain a higher price for the debentures. This proved to be so; but only to a limited extent. For the debentures offered ten years ago, they received 104 and 105 per cent. In making the new issue of £13,750, they had taken, he might say, the key-note from the Crystal Palace Gas Company. That Company had issued several thousand pounds' worth of debenture bonds, and had realized £150 per cent. by issuing them at 5 per cent., and irredeemable. The Directors certainly considered the Croydon Company had quite as good credit as the Crystal Palace Company; and they were not deceived. They issued the debenture stock in December; and the price averaged £153 16s. 6d. per cent. He thought it was a "feather in their cap" to be able to say they had beaten the Crystal Palace Gas Company in this respect. Dealing at considerable length with the accounts, the Chairman stated that, during the half year, they had received on capital account £16,823. Of this £100 was the balance unpaid from the "B" stock which was unpaid in the previous half year. Of the debenture stock, they had received £10,850, and £5873 as premium. They were actually borrowing money on the debenture bonds at a cost of a fraction above 3 per cent. The amount expended on capital during the half year was £15,055, of which the principal items were £9000 for the new gasholder tank, and £4101 for new mains, &c. The trunk main connecting Croydon and Carshalton had been laid; and, immediately they were able, they supplied gas from Croydon to the Carshalton district, and the works there had been closed. This had effected an immense saving. The balance on capital account stood at £5597. Seeing they had a large sum to pay away, and having fulfilled their agreement with the Corporation to call up the debenture capital, the Directors intended to shortly make a call upon the shares not fully paid of the Carshalton Company. Coming to the revenue account, they had received £54,850 from all sources. The increase in the consumption of gas, compared with the corresponding period of 1893, had been very satisfactory—in fact, he had failed to find, though there might be one or two, any other Company who showed an increase equal to theirs. The growth was 5·87 per cent., representing 14,760,800 cubic feet of gas, or in money £298. Some of the shareholders might regard this as being very small; but it must be remembered that, in the preceding half year, they made a reduction of 1d. in the price in Croydon (making it 2s. 9d. per 1000 cubic feet) and of 1s. in the Carshalton district, which together was a loss, in round figures, of £2000. It was singular to note that the increased returns on two of the residuals—coke and tar—had nearly made up this amount. Pointing to the increase in meter and stove rental, he remarked that the Board still looked upon the prepayment meter system as one of the growing branches of the Company's business. The increase in the number of prepayment meters supplied last half year, as compared with the corresponding period of 1893, was 347. With reference to the residual products, he stated that the increases were as follows: On coke, £1123; breeze, £105; and tar, £941. The last-named residual, had greatly improved in price—¾d. a gallon more than in the corresponding period—and it showed a tendency to go higher still. The receipts for sulphate of ammonia had advanced by £125; and they had made 31 tons more of it. The price, however, had not been so good by 15s. per ton. The total expenditure was £41,246. Coal had cost them £20,683; and they had carbonized 27,441 tons, or 1368 tons more. A large portion of the additional income received from coke, they attributed to the new regenerative settings. There was not the slightest doubt that to these settings they owed a great saving in fuel, which their Engineer (Mr. J. W. Helps) estimated at 1 cwt. per ton of coal carbonized. Of course, it would become a questionin the future as to how long they would continue to make gas from the old settings of retorts. During the summer months, most of them were not in use; and they had been carrying on the manufacture with the regenerative furnaces, which had answered every expectation. The profit on the six months amounted to £13,604. The balance from the previous accounts was £19,667, and from the Carshalton Gas Company, £2862—making £22,530. The dividends paid for the previous half year required £13,349, which left a balance of £9180. Adding to this the profit of £13,604 gave them £22,785; and after the dividends now proposed were paid, there would be £6269 to carry forward. He thought this result must be considered highly satisfactory; seeing that they had reduced the price of gas, and transferred £500 to the reserve fund. The Chairman also supplied some particulars as to the reserve and insurance funds, showing that the two together amounted, in round figures, to £41,000, which, he thought, was a good backbone for any company to possess. Referring to the incandescent gas-light, he held that there was not the slightest doubt it was a strong enemy to the electric light, for with it the maximum light was obtained from gas at the minimum cost.

The DEPUTY-CHAIRMAN (Mr. A. J. Lambert) seconded the motion.

The CHAIRMAN, in replying to Mr. B. Green, who asked why the dividends should not be paid free of income-tax, said the Directors had considered it would be far more satisfactory to decrease the price of gas before they attempted to deal with the matter; but they would not overlook it. He also expressed the opinion that the price of gas in Croydon—2s. 9d. per 1000 cubic feet—compared very satisfactorily with the charge in other districts.

The motion was unanimously carried.

Mr. S. SPENCER proposed, Mr. STONEMAN seconded, and it was agreed, that the following dividends for the past half year should be paid: At the rate of 14 per cent. per annum on £51,600 of "A" stock; 11 per cent. on £157,500 of "B" stock; and 9 per cent. on £25,000 of "C" stock and £5000 of £10 ordinary shares, on which £2 each has been paid (Carshalton capital).

The retiring Directors (Messrs. Hussey, Pelton, and Spencer) and Auditor (Mr. J. Jones) having been re-elected,

The CHAIRMAN moved a resolution, increasing the salary of the Secretary by £100 per annum from Jan. 1 last. He drew attention to the large amount of extra work which had fallen upon Mr. Russell through the amalgamation and the conversion of the shares into stock, all of which had been done to the entire satisfaction of the Board. By the amalgamation, they had saved £726 formerly paid away as salary at Carshalton. When Mr. Russell was appointed Secretary in 1871, the annual income was only £34,855; while now it was £109,700. His salary had stood at £600 for many years; and he had been in the service of the Company for 32 years. Alluding to the Engineer, he added that during the past few years they had spent large sums of money in extending the works; and the Directors would have shown great ingratitude if they had not looked after Mr Helps. This they had done in a manner which he believed was satisfactory to that gentleman.

The motion was seconded and unanimously agreed to.

The SECRETARY having heartily thanked the shareholders,

The services of the Chairman, Directors, and officers were fitly acknowledged.

In the course of his reply, Mr. HELPS observed that his interests and salary had been considered during the half year; and he wished to take this opportunity of thanking the Directors most warmly for the manner in which they had treated him.

PROVINCIAL GAS AND WATER COMPANIES.

Several additional reports and financial statements of Provincial Gas and Water Companies have been received during the past week; and from them we have taken the following information as to the working of the undertakings.

Gas Companies.

It was reported by the Chairman (Mr. R. Berridge) at the recent meeting of the Ascot District Gas Company that the past half-year's working had resulted in a profit of £765; and this sum, added to the balance from the last accounts, had enabled the Directors, after providing for every charge against the half-year's working, to write off the whole of the balance of preliminary expenses, which their Auditors had been pressing them to do for some time back. The balance at the credit of the profit and loss account was £565; and out of this a dividend at the rate of 2½ per cent. per annum was recommended. The Company had issued a circular to the effect that they were prepared to lay services, fix penny-in-the-slot meters, and pipes and fittings for one pendant and two brackets, or two burners and one small boiling-ring in all cottages, shops, &c., within 30 feet of the mains; and for the present 15 cubic feet of gas would be supplied for 1d. In addition to this, users of gas-stoves would be charged a special rate of 4s. 9d. per 1000 cubic feet (which was 3d. under the ordinary rate) for all gas used either for heating or cooking. This arrangement dated back from Jan. 1, and under it they were doing fairly well. The adoption of the report was seconded by Mr. Alfred Kitt; and the motion was carried.

In the JOURNAL last week, we briefly noticed the annual meeting of the Barnsley Gas Company, which was held on the 18th ult., under the presidency of Mr. E. G. Lancaster. In moving the adoption of the report, the principal features of which have been already given, the Chairman said the accounts for 1894 compared favourably with those of 1893, in which year the disturbance in the coal trade being so long continued upset everything, and practically put the Company into the same position as they were in 1892. The figures for 1894 were practically identical with those for 1892. Taking the first large expenditure, coal in 1894 cost £7060; in 1893, £8500, or £1500 more; and in 1892, £7426—giving an advantage to 1894 of £366. The question of meter-rents was cropping up; and it was the Directors' duty to put an explanation before the reflecting public as to what this matter really meant. The item in the balance-sheets—"meter-rents" was misleading. It ought to be "meter-rents, expenses of putting in, and maintenance of services." On this work, the Company expended last year £691, and had received back as rent £750—a difference of £59. In the last three years, under this head, they had expended £2216 on repairs and renewals, and only received £2196, or £20 less than they had spent. This meant that the thousands of pounds sunk in meters belonging to the Company did not produce a penny towards the dividend paid. They had at least 4000 meters, which had cost, one with another, £2 each—representing £8000. The services to these 4000 meters would have cost from 30s. to 40s. each—say, £6000; so that there was a sum of £14,000 dead money sunk, which did not produce anything. No one who thought out the subject fairly would say they were justified in striking off the meter-rents. If they did, they would have to make a charge in some other form. The next item was a terrible one to deal with—that of rates and taxes. Last year they paid £1380, against £1080 in 1893 and £1092 in 1892. That was to say, before the shareholders could take one penny of dividend, the public authorities stepped in and took 15 per cent. of the whole earnings of the Company. The Directors thought they ought to be satisfied with a tithe, which would represent about £800. The sale of gas, exclusive of public lamps, had been 112 millions—a gain of 7 or 8 millions on 1893, and a money gain of £1378, but practically the same as 1892; the actual money gain over 1892 being £112. Residuals showed only a slight falling off, which was satisfactory, as the year 1894 had not had the full benefit of the increased price of coke. But the correct way of comparing results was this: In 1893, the cost of coal, carbonizing, &c., was £1 6s. 2½d. per ton; and the products sold for £1 13s. 3½d. per ton—a profit of 7s. 1d. per ton. Last year, the cost was £1 5s. 7¾d. per ton; and the products realized £1 16s. 2½d.—leaving a margin of about 3s. per ton in favour of last year, which accounted for the increased profit shown in the balance-sheet. This result had not been obtained without immense exertion on the part of the Manager (Mr. W. W. Hutchinson) and the staff; and he took the opportunity of referring to the serious loss the Company had sustained in the death of the late Manager, Mr. John Hutchinson, who had been connected with the undertaking as Manager ever since he (the Chairman) was a boy. His aim was always the welfare of the Company with which he had thoroughly identified himself, notwithstanding the severe and sometimes unkind strictures of the public, which, fortunately, he lived long enough to see considerably modified. The Company were fortunate that Mr. Hutchinson's son had been associated so long with him, that virtually for the last few years they had been co-Managers; and, as a natural consequence, he had stepped into his father's shoes. The present year was opening satisfactorily; and there was every prospect of presenting on the next occasion a satisfactory balance-sheet, because this year would be free from any evil effects of the late terrible struggle in the coal trade, which involved an increased expenditure of £2400, while the only benefit was about £400 in the additional price of coke. But for this, they would have paid the maximum dividend for 1894, and been in a position to modify the price of gas.

In moving the adoption of the report and accounts at the annual general meeting of the Canterbury Gas and Water Company on Monday last week, the Chairman (Mr. G. Furley) congratulated the proprietors on the satisfactory financial condition of the undertaking. At the beginning of last year, the price of gas was 3s. per 1000 cubic feet. From this, 2d. was taken off; reducing the figure to 2s. 10d., and lowering the receipts of the Company by £927. But, fortunately, owing to the increased value of residuals and the reduction in the cost of coals, this falling off had been more than compensated for. The Company had earned the full 9 per cent.; and it was a pleasure to him to suggest that the same dividend as last year should be declared. So far the sliding-scale had been of great advantage to the Company; and so it had been to the consumers, by reducing the price of gas to them as much as possible. There was a long statement in the report as to the alterations the Directors thought it necessary to carry out in the works. The plans were now being prepared; and before the year was out he hoped they would be brought to a satisfactory conclusion. As regarded the water portion of the undertaking, he need not say anything. This was going on as satisfactorily as it could be. There was a gradual increase in the number of consumers; and he hoped this would continue for some years to come. It was now twenty years since they struck water through the chalk; and during all that time they had never had one hour's trouble with regard to the supply. Reverting to the proposed alterations, he might mention that the Directors thought it desirable, as far as they could, to carry out the work themselves under the superintendence of the Gas Manager (Mr. T. May, Assoc.M.Inst.C.E.); and only those portions which they did not feel confident in doing themselves were to be put out to contract. Mr. May conducted the works in a very satisfactory manner; and as regarded their worthy Secretary (Mr. J. Burch) and the Water-Works Manager, they certainly had exerted themselves in a most admirable way during the past year. Mr. May had rendered specially good service during the severe frost. He thought their thanks were due to the officers, and also to the employees. Another point was that negotiations were in progress between the Town Council and the Company with regard to better public lighting. The Council felt that the present service was not quite adequate for a place like Canterbury; and the Company would be very pleased to give them a better supply. The report was adopted, and it was subsequently resolved that a dividend of 4½ per cent. for the half year ending Dec. 31 last be paid, free of income-tax. The thanks of the meeting were accorded to the Directors, who were granted a sum of £500 for their services.

The Chesterfield Water and Gas Company had their ordinary meeting last Wednesday, when the report presented by the Directors stated that the balance of the net revenue account enabled them to recommend the declaration of the dividends proposed in the statement of accounts; leaving a balance of £1324 to be carried forward. The net profit for the half year ending Dec. 31 last was £4849; being £1071 more than in the corresponding period of 1892. In the six months ending December, 1893, the net profit amounted to £3376; or £402 less than in the latter half of the preceding year. Reference was made to the fact that the Chesterfield Municipal Corporation and the District Councils of Whittington and Newbold and Dunston have promoted a Bill to enable them to purchase the Company's undertaking; and it was stated that the Board had petitioned to be heard on the clauses in which the Company are directly concerned.

The half-yearly general meeting of the Derby Gas Company was held on Wednesday last—Mr. J. Cooper (the Deputy-Chairman) presiding. The Directors reported a slight decrease in the quantity of gas sold, owing chiefly to the mildness of the weather during November and December last. The letting out of gas-stoves and cooking-ranges on hire is working very satisfactorily. The Company have upwards of 380 gas fires and cookers on hire at the present time; and with the view to the further development of this branch of the business, the Directors are arranging for a gas exhibition on a larger scale than that held last year, to be opened on the 27th inst. The accounts presented showed that the expenditure for the year amounted to £46,571; while the income was £69,587—leaving a balance of £23,016. The Directors recommended the payment of dividends at the rates of 10, 7, and 5 per cent. per annum upon the respective classes of stock. The Chairman, in moving the adoption of the report, remarked that he could not help thinking that the practice of treating their customers liberally, and giving them the most approved gas appliances, would, in the long run, be beneficial to all concerned. Mr. Jefferson, in seconding the motion,

dealt with many of the items in the balance-sheet in detail, and stated that they would have to go back three or four years to properly understand their position For instance, the great coal strike of 1889 caused serious inroads to be made on their reserve fund. In 1891, they had to take £5465 from this fund to make up their losses; in 1892, they had to draw £3552; and in 1893, a sum of £1133, to meet their losses on the preceding years. The coal strike of 1893 involved the expenditure of £4000 or £5000 upon coal above the contract prices; and they had to go to the reserve fund for £726. At present the fund stood at £8306, which he thought was very small for a Company of such magnitude. The motion was carried; and the dividends recommended in the report were declared.

The half-yearly general meeting of the Eastbourne Gas Company was held on Monday last week, under the presidency of Dr. G. A. Jeffery. In moving the adoption of the report (the principal portions of which were given in the JOURNAL last Tuesday), the Chairman remarked that, though the Company reduced the price of gas to a considerable extent last year, the reduction entailing a loss of nearly £1000, they still made a profit. The sale of gas during the six months past showed an increase of 3,132,000 cubic feet as compared with the corresponding period of the preceding year. This was below the usual rate of increase; but they had to take into account the fact that during the last three months of 1894 the weather was almost at summer temperature. The bulk of coal carbonized was 11,025 tons; and it had produced 115,178,000 cubic feet of gas, or 10,418 cubic feet per ton—an improvement of something like 80 cubic feet per ton, which spoke well for the quality of the coal and the care of the Manager (Mr. J. Hammond). The leakage, which had been gradually reduced during the previous four or five half years, was still lower during the past half; and the returns from the residuals were quite satisfactory. He thought they were greatly indebted to their indefatigable and painstaking Manager for a great deal of what was in the report. Indeed, all the officers and men had helped, and he believed had done their utmost to meet the requirements of the Directors. Referring to automatic meters, the Chairman said they were not only the penny but shilling in the slot meters. Consumers could have a meter and put in a shilling for 300 cubic feet of gas. It was, perhaps, not politic for a gas company to praise a gas light for which they were really using only half the quantity of gas; but he took it that those persons who were not yet employing the incandescent gas-light would do so, and they would have a great number of people taking it up, and by that means he thought gas companies would profit by it. Mr. Bennett seconded the motion; and it was carried *nem. con.* A vote of thanks having been accorded to the Directors for their services, Mr. Steinle proposed a similar vote to the Secretary (Mr. J. H. Campion Coles) and officers. Mr. Jones, in supporting the proposition, observed that he had the accounts of fourteen different Gas Companies in the Metropolis, suburbs, and provinces, and in no single case could they show better ones than those of the Eastbourne Gas Company—the result of the careful management and attention to the daily duties at the works by Mr. Hammond. The motion having been carried unanimously, Mr. Coles and Mr. Hammond replied.

The annual meeting of the East Grinstead Gas and Water Company was held on Thursday, the 21st ult.—Mr. W. V. K. Stenning presiding. The Directors' report showed that the receipts from the sale of gas in the past year were £2789, as compared with £2661 in 1893; from residuals, £735, against £681; and from water, £1286, against £1208. The price of gas was reduced from 4s. 7d. to 4s. 4d. on April 1 last. The accounts showed an available balance of £1309, from which the Directors recommended dividends of £6 and £4 4s. per cent. per annum, free of income-tax. This absorbed £1147. It was also proposed to write off a further £100 from the capital account, lost by the bank failure in 1892. The Chairman, in moving the adoption of the report, and also of the recommendation respecting the payment of the dividends, said that steady progress had been made during the year. The increase in the consumption of gas as the result of the reduction in price was about 9 per cent. The supply of water had been ample and of good quality. Mr. Rice, in seconding the motion, asked how long the present water supply would meet the requirements of the town. The Chairman said they had not quite recovered from the drought of 1893. Geological experts said that last year the water supplies, following on the exceptionally dry weather, had not recovered their normal conditions. With the wet autumn experienced, however, he believed the Company had sufficient to meet all present wants. The report was adopted.

The profits of the Elland Gas Company for 1894, including the sum brought forward, amount to £4585. An interim dividend at the rate of 12s. per share, with the prescribed dividends on the preference shares and interest on the loan capital for the year, absorbed £2483. The balance of £2102 allowed of the declaration, at the meeting of the shareholders last Friday week, of a further dividend at the rate of 12s. per share, making 12 per cent. for the year. The consumption of gas increased in the twelvemonth by 4,588,000 cubic feet.

The accounts of the Leominster Gas Company for the past year, which were presented at the ordinary general meeting last Thursday, showed a profit of £824; and the Directors recommended the payment of the usual maximum dividends, at the rates of 10 and 7 per cent. per annum. The receipts amounted to £3516; and the expenditure was £2692. The working of the Company during 1894 was, on the whole, very satisfactory. There was an increase of 1,103,000 cubic feet in the consumption of gas for private purposes, or at the rate of about 9 per cent. on that of 1893. This augmentation is the largest in the history of the Company; and it has arisen partly from an increased use of gas for engines and stoves, and partly from the fact that the new apparatus has allowed a more ample supply of gas to be furnished to the consumers. The unaccounted-for gas has been reduced; the actual sale of gas last year having been 9389 cubic feet per ton of coal carbonized.

The annual revenue account of the Matlock and District Gas Company shows a balance of £2173, which is a trifling increase on the profits of the preceding year; but it should be stated that a reduction in the price of gas was in force for three-quarters of the year. On the net revenue account, after payment of the debenture interest and the interim dividend, there is a balance of £1116. From this a dividend of 5 per cent. is proposed for the past half year. A new scrubber and sulphate plant have been added to the works; and a contract has been entered into with Messrs. S. Cutler and Sons for the construction of a holder for £1900, which will necessitate the creation of further capital.

Out of a divisible balance of £1202, the Pontefract Gas Company are paying dividends at the rate of 10 per cent. per annum on the original shares and of 7 per cent. on the new ordinary shares.

The annual general meeting of the Rugby Gas Company was held last Thursday, under the presidency of Mr. J. Parnell. In their report, the Directors stated that the affairs of the Company were in a satisfactory condition. The receipts on revenue account for the year ended Dec. 31 last amounted to £13,081, and the expenditure (including bad debts) to £8182; leaving a balance of £4899 to be carried to the profit and loss account. This balance, after deducting the interim dividend, added to £3211, the net balance after payment of the dividend for the half year ended Dec. 31, 1893, with interest on moneys deposited, less interest on mortgages, and £650 carried to the capital account for depreciation in respect of the old gasholder, made a net balance of £5534. The Directors recommended a dividend for the half year at the rate of 11½ per cent. per annum, amounting to £1719, to be paid free of income-tax. The accounts accompanying the report showed receipts to the amount of £13,081; the expenditure being £8128. During the year, 6947 tons 6 cwt. of coal were carbonized; and the estimated quantities of residual products were as follows: Coke, 4218 tons 2 cwt. 2 qrs.; lime refuse, 122 tons 5 cwt. 1 qr.; breeze, 173 tons 13 cwt.; tar, 424 tons 15 cwt.; ammoniacal liquor, 863 tons 9 cwt. The report was adopted, and the dividend declared.

The half-yearly general meeting of the Salisbury Gas Company took place on the 20th ult.—Mr. G. Fullford in the chair. In moving the adoption of the report, the Chairman said the sale of gas in the six months ending Dec. 31 last was rather less than in the corresponding period of the previous year. This was quite accounted for by the milder weather that prevailed before Christmas; and the severe weather since experienced would more than compensate for it. But although they had not received so much money, their expenses had been less; and they were able to do a little towards recovering the heavy loss occasioned by the coal strike of 1893. The new gasholder was put into operation in November, and continued to work satisfactorily up to the present. Without it, he did not know how they would have encountered the heavy demand for gas during the recent frost. He moved that the usual dividends, at the rate of 10, 8, 7, 6, and 5 per cent. per annum on the various classes of shares, be declared. Mr. S. Griffin, in seconding the motion, said he considered the figures placed before the meeting were thoroughly satisfactory. The increased demand for gas during January gave some idea of the extent to which it was used for heating as well as for lighting purposes. Now that coal had come back to something like normal rates, they were able to recover some of their lost ground. With regard to the new holder, the prolonged frost and cold winds had proved a very severe test for it; and the fact that it had been in efficient operation for more than three months might be referred to with some satisfaction, as proving it to be sound and well built. After some conversation as to the steady increase in the rates and taxes, the motion was carried. A vote of thanks having been accorded to the Chairman and Directors, Mr. Fullford proposed a similar compliment to the Manager (Mr. T. Hardick) and the Assistant-Manager (Mr. Norton H. Humphrys, Assoc.M.Inst.C.E., F.C.S.) for their services. He remarked that Mr. Hardick had been their trusted adviser for many years past; and they hoped he would continue so for many years to come. They had also an efficient officer in Mr. Humphrys, who had successfully contended with the difficulties due to the severe weather. The proposition was carried, and acknowledged by Mr. Hardick.

The annual general meeting of the South Shields Gas Company was held last Thursday, when the Directors reported that the receipts from the sale of gas and residuals in the past year had been satisfactory; the former showing an increase of £1090, and the latter of £1666, as compared with the year 1893. The income for the period covered by the report was £61,210; the expenditure, £39,658—leaving a balance of £21,552, or £2079 more than in 1893. The balance available for distribution was £12,818, which the Directors recommended should be appropriated as follows: In payment of a half-year's dividend of 4½ per cent. (with the interim dividend of 4½ per cent., making 9¼ per cent. for the year), £7396; in liquidation of the suspense account, £600; in part payment of arrears of dividend, at ¾ per cent., £1168; to the credit of the insurance and reserve funds, £3000—leaving to be carried to the next account, £654.

The half-yearly general meeting of the Thirsk Gas Company was held last Wednesday, when the accounts presented showed a net profit of £781 for the past year, and a balance of £467 to the credit of the profit and loss account. Out of the latter sum, the Directors recommended the payment of a dividend at the rate of 3¼ per cent. on the original and additional capital; making, with the interim dividend of 3 per cent., 6¼ per cent. for the year. After payment of this, there would be a balance of £149 to be carried forward. The Directors had in contemplation the erection of a new bench of retorts in the coal-store; but, after giving the matter careful consideration, they decided to rebuild the existing bench in its present position. The report was adopted; and the dividend recommended was declared.

In commenting upon the report and accounts at the meeting of the Uxbridge and Hillingdon Gas Company on the 19th ult., the Chairman (Mr. W. Fassnidge) stated that the receipts for the past year were less than in 1893 by £138. The quantity of gas sold in 1893 was 32,459,000 cubic feet; and in 1894, 32,142,900 cubic feet—showing a decrease in consumption of 316,100 feet. The residuals, however, had not on the whole fallen lower in price. The amount realized for coke, breeze, tar, and liquor was £1436, as against £1444. The gross expenditure was less than in 1893 by £429. This was accounted for partially by a smaller make of gas, and not being compelled to purchase so much coal outside their contracts as in 1893, as well as a saving in distribution. After paying the debenture interest, &c., there remained £2910, which, with the surplus profit of the previous year, gave a sum of £2974 at the disposal of the shareholders, which was sufficient to pay the statutory dividends, amounting to £2575, and leave a balance of £399. He also remarked that the business during the early part of 1894 gave promise of an increase; but the mild weather which prevailed through

the autumn up to the end of the year had a contrary effect, and the gas-rental consequently showed a falling off, instead of an increase as anticipated. The report was adopted.

The half-yearly general meeting of the Waltham Abbey and Cheshunt Gas Company was held at the offices, Waltham Cross, last Thursday, under the presidency of Mr. Corbet Woodall, M.Inst.C.E. According to the statement of accounts presented with the report, the total expenditure on gas manufacture in the half year ending in December last was £2686; the receipts amounting to £3685. On the profit and loss account, there was a balance of £2047 available for division, of which £998 was earned in the past half year. The Chairman, in moving the adoption of the report, stated that the general working account had, in some respects, been peculiarly and eminently successful during the six months. There was an augmentation of more than 17 per cent. in the quantity of gas sold, due to increase of population, reduction in price, the adoption of prepayment meters, and the use of gas-stoves for heating and cooking purposes. The unaccounted-for gas had been reduced 2 per cent. The new retort-house (which the Company were compelled to erect owing to want of improvements in the old one) was now complete, and reflected great credit upon their Engineer and Manager (Mr. W. B. Randall), who had designed the building and had carried the work through. Mr. Alfred Kitt, Assoc.M.Inst.C.E., seconded the motion, and it was at once carried—not a question being put. It was agreed to pay dividends at the rate of 7 per cent. per annum on the original or "A" shares (an increase of 1 per cent. on the previous half year), and of 5 per cent. per annum on the "B" and "C" shares, less income-tax. Mr. Kitt was re-elected a Director, and Mr. Yeats an Auditor of the Company.

The half-yearly general meeting of the Wolverhampton Gas Company was held last Tuesday, under the presidency of Mr. H. Ward. In moving the adoption of the report, which was noticed in the JOURNAL last week, the Chairman stated that they had a much larger balance in the past half year than they had in the previous one. It would have been even more considerable but for the advance in rates and taxes, which had been £829 more than in the previous six months. During the present year the rates would be £1700 higher than they were in 1893. The new assessment would increase them to an amount equal to 1d. per 1000 cubic feet of gas; so that for every 1000 feet of gas sold, 2½d. had to be paid in rates. There had, however, been a reduction in the price of coal; and the Directors had decided to give the customers the benefit by lowering the price of gas by 3d.—bringing it to 2s. 6d. per 1000 cubic feet. This meant a loss of £5400 on the year; but it was hoped by economy and an increase in the consumption to meet it. He was pleased to say that, notwithstanding the introduction of the electric light by the Corporation, the quantity of gas used was of a favourable character. It was also proposed to introduce automatic meters; and it was hoped that the income would thereby be increased. The Company were compelled, during the recent bad times, to reduce their reserve fund to almost vanishing-point; and it was now proposed to add £3000 to it, and carry £587 to the next half-year's accounts in order to meet the reduction in the price of gas. The motion was carried; and the usual dividends were declared. The proceedings closed with the usual votes of thanks. The Engineer and Manager (Mr. John Annan), in acknowledging a compliment to himself and the officials, said he did not see much advantage in the electric light for shops, though it was a good illuminant for the streets. The consumption of gas in the town was increasing, and the large demand during the past few months had been quite surprising.

Water Companies.

The annual accounts of the Clevedon Water Company show a balance of revenue of £1436; and from this a dividend of 6½ per cent. was declared at the recent meeting. On that occasion, it was stated by the Chairman (Mr. E. Button) that the business had been steadily increasing, and was likely to continue to do so. The Directors had thought it well to raise the depreciation fund to £2000; and, while giving the shareholders a dividend of 6½ per cent. per annum, they were proposing to make a substantial reduction to the public by substituting a 5 for 6 per cent. rate on the rateable value of the houses supplied.

The half-yearly general meeting of the East Warwickshire Water Company took place at Nuneaton last Friday, under the presidency of Captain H. Townshend. The Directors' report showed that there were 1825 houses connected with the Company's mains, as against 1779 houses in August last. The gross amount of water-rates for the half year was £1052, as against £921 in the corresponding period of the previous year. A deficiency of about £95 was shown in the profit and loss account, which had arisen in consequence of the heavy expenditure through deepening the well and driving headings. The report and statements of accounts were adopted.

The 31st half-yearly meeting of the East Worcestershire Water Company was held last Thursday, at the offices, in Birmingham—Mr. C. Perrott Noel, the Deputy-Chairman, presiding, in the absence of Lord Windsor, the Chairman. In moving the adoption of the report, which was noticed in the JOURNAL a fortnight ago, the Chairman said the position of the Company was a very satisfactory one. There had been a large increase in their extensions; but the services at Stoke were not laid on until late in the year, and the revenue account had only benefited by a month's rental from this source. These services would, no doubt, result in a large revenue to the Company. Considerable water had been obtained from the third borehole, to which reference was made in the previous report. The Company's shares held a good position in the market, and sold at par. The motion was carried.

The water-rents of the Maidstone Water Company for the half year ending Dec. 31 last amounted to £4809; and the accounts, after providing for the payment of interest on mortgages, the preference dividend, and the income-tax, show a balance of £1814 available for dividend; making a sum of £5293 to the credit of the profit and loss account. Dividends for the half year of £3 18s. 4d. per cent. on the 10 per cent. shares, and of £2 15s. per cent. on the 7 per cent. shares, have been declared. These will absorb £1756. The dividends were £4 16s. 8d. and £3 7s. 6d. in the corresponding half of 1893.

At the fiftieth annual general meeting of the Newcastle and Gateshead Water Company last Tuesday, the Chairman (Mr. W. D. Cruddas, J.P.) made an interesting statement when moving the adoption of the report, the principal portions of which were noticed in the JOURNAL for the 29th ult. He said the amount standing to the credit of revenue and interest—£41,349—admitted of the payment of the dividends specified in the report, and left a balance of £6028. The capital account for the year showed an expenditure of £193,179. Of this, the very large sum of £133,932 had been expended on the Rede works. The Directors were satisfied with the energetic and able manner in which this work had been carried out. The quantity of plant supplied was very large; but the Directors, wishing the completion of the works in the shortest possible time, were resolved that nothing should be wanting to carry them out. Upon the completion of the pipe-line, the water in the Rede, subject to compensation, would be conveyed to the Hallington reservoirs; and then there remained the great work of the new impounding reservoir, powers to construct which had been obtained in the same Act. A considerable amount had been expended on the new filter-beds at Whittle Dene; and they had every reason to expect that they would be finished during the present year. Half of the filters had been in use; and when completed, it would be as perfect a filter-plant for its size, as could be seen anywhere. In addition to the works in progress of which he had spoken, they had now decided to lay a new 30-inch main to Gateshead. It would be taken across the Tyne at Newburn, would pass through Blaydon and Swalwell to Gateshead, and would be a great advantage to that town as well as to the Company. The 140,000 people resident on the southern side of the river would then be supplied by the new main instead of, as hitherto, by way of Newcastle; thus leaving the line now running into Newcastle entirely applicable to the north side of the river, and so prolonging the life of the Newcastle main. With regard to the recent frost, which had caused the greatest inconvenience to the Company and to their tenants, he must say that the Company had endeavoured to mitigate, as far as possible, the inconvenience from which they had suffered. In this connection, it might be mentioned that the normal consumption of water in the month of February was not more than 15 million gallons per diem. The daily delivery of water from the time the frost commenced had averaged not less than 19 million gallons. It was true, unfortunately, that this was not in reality the consumption; for a good deal of waste was represented by the figures. The total number of men engaged in attending to complaints, stand-pipes, &c., in Newcastle was 206; being an excess of something like 120 over the number usually employed. In Gateshead, 68 additional men were occupied in looking after these things. Nothing that could be done had been left undone to minimize the inconvenience arising from the frost. While the Directors of the Company had a duty to perform to the shareholders, they were fully alive to the fact that they held a great public responsibility; and to the discharging of that responsibility they gave their most careful attention. The motion was then seconded, and carried. Mr. Charles Hawksley, the Company's Consulting Engineer, having addressed the meeting on the progress of the works in hand for increasing and improving the Company's supply of water, the Chairman moved that a dividend at the rate of 8 per cent. per annum be paid on the ordinary stock, making, with the interim dividend paid in August last, 8 per cent. for the year; of £5 12s. on the stock under the Act of 1876, making a dividend of £5 12s. per year; and a dividend at the rate of 5 per cent. per annum on the preference stock. The motion was agreed to; and the proceedings closed with the usual complimentary votes.

The half-yearly meeting of the Woking Water Company was held last Tuesday, at the London Offices, 5 and 6, Great Winchester Street. The Chairman (Mr. Charles Horsley, J.P.), in moving the adoption of the report and accounts, stated that the total expenditure on capital account was now £78,948. The revenue for the entire year amounted to £5782; and the expenses, to £2533. The expenditure had been rather heavy, in consequence of the drought in 1893 causing extra outlay for labour, maintenance, repairs, &c., which had to be charged against the past year's accounts. The balance carried to the profit and loss account was £3249. The amount available for division was £1566, out of which the Directors recommended the payment of a dividend at the rate of 4 per cent. per annum for the second half of the year, which would absorb £1441. The capital had gone up rather largely, owing to the fact that they had two wells which furnished a good supply of water; but the machinery had not been sufficiently powerful to deal with it. He was happy, however, to say that the duplication of the engines, pumps, and boilers had now been completed, as well as the mains connecting the West Horsley and Clandon districts. Speaking of the recent frost, he said he did not think they had had more than two mains frozen in the whole of the district; and those were the mains which they took over from Guildford, and which the Directors had decided to relay at a greater depth. The capital account had gone up about £8000; but the income had not kept pace with it. They had 141 more consumers, who, of course, would bring in a little more revenue. Mr. R. Hesketh Jones, in seconding the motion, remarked, with reference to the expenses on revenue account, that they were equal to something like 44 per cent. of the rental, which was about 4 per cent. in excess of what the Directors thought was a fair amount. Alluding to the Frimley and Farnborough District Water Act of 1893, he explained that some six or seven years ago the Directors were looking about for an increased supply of water. They were told, and they believed, there was an abundant supply to be had in the area comprised in the Surrey and Hants District Water Act of 1887. An arrangement was made by which they acquired that Act, for which they paid £4000. Subsequently they found it would be a very expensive proceeding on their part to put down plant so many miles away from their existing works, besides which they failed to get a guarantee from the locality. An agreement was made with a Company which was formed in the Frimley and Farnborough district to take over their rights; and they in consideration took £5000 of deferred shares and £170 of ordinary shares. Mr. Jones explained how these arrangements had been dealt with in the accounts. The motion was adopted; and the proposed dividend was declared. The outgoing Directors and Auditor were re-elected. The death of Mr. W. H. Hardy, who was one of the Auditors, was referred to with much regret.

GAS-WORKS EXTENSIONS AT WALSALL.

Local Government Board Inquiry.

Last Wednesday week, Major-General H. D. Crozier held an inquiry at Walsall relative to an application by the Corporation to the Local Government Board for a Provisional Order to empower them to purchase, by agreement, additional land for their gas undertaking, but not for the manufacture of gas or residual products, and to borrow money for the purposes of the undertaking in addition to the sums already authorized. The Town Clerk (Mr. J. R. Cooper) submitted particulars, plans, &c., in support of the application. He informed the Inspector that the gas-works had been constructed on land at the Pleck; but at the time the Act of 1876 was obtained, the Improvement Commissioners had works in another part of the town. By the Act, these works were transferred to the Corporation. However, since 1876 there had been a great increase in the population, with, of course, a corresponding growth in the demand for gas. In 1876 the make of gas was 134 million cubic feet; whereas last year it reached 338 millions. Some time ago it was decided to close the Wolverhampton Street works as far as gas manufacturing was concerned, but not for storage. This had rendered necessary very considerable extensions at the Pleck works. The area of land which the Corporation obtained power to purchase in 1876 had become too restricted for their requirements; and an opportunity now presented itself by which the Corporation could acquire adjoining land containing an area of six acres. With reference to the financial part of the application, the Town Clerk pointed out that, by the Act of 1876, the Corporation were enabled to borrow the sum of £100,000; but in 1882 it was found necessary to apply to the Local Government Board for an extension of borrowing powers, and a Provisional Order was granted by which the Corporation were authorized to borrow an additional sum of £50,000. It had now become absolutely necessary that they should secure further money powers. There had been an overdraft of £8000, owing chiefly to the retort-house having been made larger than was at first contemplated. The Gas Engineer (Mr. J. Tindall) estimated that the expenditure of the Corporation during the coming five years would be £40,000, irrespective of outlay which might have to be made in mechanical stokers and other modern appliances. It was thought the capacity of the Pleck works would be increased to 500 million cubic feet; and the additional amount the Corporation wished for power to borrow was £50,000. At the conclusion of the inquiry, the Inspector visited the works.

THE BRITISH GASLIGHT COMPANY'S BILL.

Ratepayers' Meeting at Hanley.

A public meeting of the burgesses of Hanley was held last Friday week, for the purpose of considering and sanctioning or otherwise a resolution in opposition to the Bill which the British Gaslight Company (who supply the district) are promoting to empower them to raise additional capital. The proceedings were of a very lively character; opposition to the action of the Corporation being very strong. A preliminary objection having been made by Dr. Folker to the manner in which the meeting had been summoned, the Mayor (Alderman E. J. Hammersley) explained its object, and then turned his attention to the Company's Bill, which, upon the face of it, he said, looked somewhat inoffensive. When, however, he mentioned that it meant the raising of £80,000 more capital for the Company, it would be seen that it assumed a very important character. If at any time it became necessary—and it would be necessary some day or other—that they should be the possessors of their own means of distributing light, they would, if this Bill passed, have to buy the undertaking at an enhanced value. Thus he thought they would all agree that the Council were compelled to oppose the Bill, in order to safeguard the interests of both present and future ratepayers. The quotation of the Company's £20 shares on the London market was £50 10s.; and this £80,000 meant giving them £120,000 straight away, while he could immediately borrow for them £40,000 at 3 per cent. For many years, this fact had been before them—that, whereas in the neighbouring towns of Burslem, Stoke, Longton, and Newcastle, they had from £3000 to £5000 a year being placed to the credit of the rates, in Hanley they were being handicapped by a Company who cared nothing whatever about the town further than the making of their dividends. All the Corporation asked was that they should be allowed as far as possible, by passing this resolution, to see that they were not handicapped more than was necessary. In Stoke, something like 9d. in the pound resulted from the distribution of gas; in Burslem, 9d. or 10d.; and 9d. or 10d., or even more than that, in Newcastle-under-Lyme and Longton. In the case of the Water Company, the shares were always put up for auction in the district; but, with the Gas Company, they had nothing at all of the kind. They distributed the shares among their own shareholders, and the people of Hanley had not the slightest possible chance of getting hold of them. Then the law stipulated that, after making a certain amount of dividend, there should be a corresponding reduction in the charge for gas. The Company had no parliamentary powers until 1866; and then they bought off opposition with moneys they had realized out of the consumption of gas by the ratepayers of Hanley. Their Act said they should take 10 per cent. upon £42,610, 7½ per cent. upon £30,000, and then in 1880, when the Council went to Parliament against them, and they (the Company) were told that they had used the town badly, they were allowed to have another £50,000 for the extension of the works at 5 per cent. Would they believe it that there were no ear-marked shares, and upon every farthing the Company were paying 13 per cent. The Act said that, having made their statutory dividends, and having made their 10 per cent. reserve, they should reduce the price of gas. They were trustees first for their shareholders, and next for the consumers. The Mayor moved —"That the Bill in Parliament of the British Gaslight Company to raise further capital be opposed, and that the costs be paid out of the borough funds." Alderman Ridgway, in seconding the motion, said he wished to call to mind the trouble the Town Clerk had in obtaining facilities for investigating the Company's accounts, after they had obtained the authority of the Recorder. Since then the Company had seen their way, although coal was at a higher price, to reduce the charge for gas. He was, however, unwilling to give the Company unlimited power to go before Parliament without placing the town in a position to watch well their Bill. Dr. Folker moved a direct negative to the motion. In the first place, Alderman Ridgway had not told them what the opposition of 1880 cost the town. It amounted to some thousands of pounds; and they obtained nothing at all for it. He did not think that in any town in the neighbourhood the people were paying so little as 2s. 6d. for gas; and he did not believe they would get better terms than those if the gas-works were in the hands of the Corporation. Any expense the Company might be put to through the opposition of the Corporation would be taken out of profits; and, as a consequence, the ratepayers would only be deferring any further reduction in price the Company might make. Mr. Lynam seconded the negative, upon which the Mayor said there was nothing to second. Mr. Lynam then spoke in opposition to the motion; expressing the opinion that if the Company continued to serve the town as well as at present, the Corporation would get little chance of purchasing the gas-works. On the resolution being put, the Mayor declared that 26 hands were held up in favour of it and 22 against. Dr. Folker demanded a re-count; but the Mayor did not accede to the request.

ELECTRIC LIGHTING NOTES.

At the meeting of the Electric Lighting Sub-Committee of the Leicester Corporation, held on Monday last week, the Gas and Electric Lighting Engineer (Mr. A. Colson, M.Inst.C.E.) submitted his official report upon the explosion that occurred in the Market Street transformer chamber on the evening of Friday, the 13th ult., as mentioned in the last number of the JOURNAL. Mr. Colson, who made a careful inspection of the chamber, the apparatus, and connections therein, within a few minutes of the accident, stated that, in his judgment, the explosion was caused by an electric arc being formed between the terminals in the high-tension junction-box, and the consequent gasifying of the oil used in the box as the insulating medium. Owing to the explosion, it has been decided to substitute specially prepared wax for the oil at present in use in the various transformer chambers in the town. Hitherto the explosions which have from time to time occurred in different parts of the country in connection with electric lighting installations have been attributed to the presence of coal gas; but in the case of the Leicester explosion, Mr. Colson is confident that coal gas had nothing whatever to do with it, but that it was owing to the oil employed becoming converted into gas by the electric current forming an arc in the way stated. It is well known that oil can be converted into gas by electricity; but this is believed to be the first instance of an explosion in connection with electric lighting being directly attributed to such a cause.

Three explosions occurred at Huddersfield, on the 22nd ult., in the junction boxes connected with the electricity supply system, and in the case of two of them, several persons had narrow escapes of being injured. The first explosion happened at an early hour in the morning; and the lid of the box was smashed, and a street-lamp near by was broken. The other two explosions took place simultaneously in the afternoon; pieces of iron and stone being scattered some distance around. The Corporation Electrical Engineer (Mr. Mountain) attributes the explosions to an accumulation of gas in the boxes, and its ignition by an electric spark.

The first fatal accident connected with the distribution system of the electric lighting undertaking of the Bristol Corporation occurred on Monday last week, when a man was killed. Two of the employees, named Wilcox and Coleman, were at work in a cellar in No. 75, Market Street, upon a transformer which needed attention, and, while so engaged, Coleman received a severe shock, which rendered him unconscious. A medical man was sent for; but the poor fellow was dead. He was 35 years old, and leaves a wife and two children.

At the meeting of the Joint Standing Committee of the Glamorgan County Council, held, under the presidency of his Honour Judge Williams, on Monday last week, Mr. Jotham brought forward the question of introducing the electric light into the County Offices. Mr. O. H. Jones said the electric light in Cardiff was in a state of the utmost confusion, and only the previous day he had seen the mains being taken up. He thought that, until they had the electric light in working order, the county had better leave it alone. Alderman Rhys moved that the matter be postponed for six months; and the motion was agreed to.

A correspondent writes as follows with reference to the Hampstead Vestry's electric lighting undertaking: "Ratepayers of Hampstead have proverbially a full purse; but surely such a waste of their money by the Electric Lighting Committee as I am about to describe will not be tolerated without a word of protest. Recently 23 arc lamps were erected in the Finchley Road; and last Thursday the Vestry decided to take these down, and re-erect 16 of them in different positions. Several members protested against this extra expenditure, and expressed their surprise that the initial mistake should have been made, when such an eminent Engineer as Mr. W. H. Preece had supervised the work. The secret leaked out when a member of the Committee admitted that too many arc lamps were erected simply 'to make a display for the edification of the ratepayers'! The gas-lamps are also used because of the Committee's 'distrust in the new illuminant.' Mr. Preece's remuneration, under the circumstances, was warmly discussed. After an animated debate, the Vestry agreed to pay him 5 per cent. commission on the outlay on works already sanctioned; but when the recommendation that he should receive 4 per cent. on the outlay for all future works came up, an amendment that 2½ per cent. was sufficient was brought forward, on the ground that Mr. Preece, being employed throughout the day by the General Post Office, could not properly supervise the work, and that he could and should simply act as a consulting authority. The amendment was lost; but the whole question of Mr. Preece's remuneration on future works was referred back for further consideration. When it is again brought up, there will no doubt be a lively meeting."

THE FINANCIAL ASPECT OF THE LONDON WATER QUESTION.

The *Financial News* for the 22nd ult. contained an article dealing with the panic which had occurred among the shareholders in the London Water Companies (presumably in consequence of the action of the London County Council), as evidenced by the extraordinary fall in the prices of stock shown by our Share List last week. Our contemporary expresses the opinion that the position assumed by the Council in regard to the tramways "has undoubtedly given ground for deep distrust on the part of investors in undertakings which may possibly be brought within its octopus-like clutch. The writer goes on to say: "In the present case, however, the apprehension is at least premature. The desire to acquire and the power to acquire are two different things. Parliament has not yet sanctioned the County Council's Bills; and we must be permitted to observe that, in their present inequitable shape, it is not likely to sanction them. That water company shareholders must make up their minds to the transfer of the control of the undertakings to some representative body, is a self-evident proposition. Nearly all the larger municipalities have taken the local water supply into their own hands, on the indisputable ground that a prime necessary like water ought not to be regulated by purely commercial conditions. . . . It does not follow, however, because the town councils of provincial cities have successfully dealt with the water supply, that the London County Council is the body to be entrusted with similar powers. At the best, it is a very dangerous experiment to enlarge the control of labour which the acquisition of industrial undertakings involves. The Council has already shown, by its action in regard to wages, that it is not above the suspicion of having political interests to serve, and of being keen to serve them. Nothing could be more fatal to the political independence of labour on the one hand, and to the absolute neutrality of the Council on the other, than the handing over to it of a vast industrial organization, whose thousands of employees would henceforth be dependent upon it for their wages and advancement." It is pointed out that Lord Farrer has seen this danger, and appreciated it; and his views, as expressed before the Labour Commission, are quoted. "It is not too much to say," our contemporary remarks, "that no strong desire is felt outside the Council itself to see the water supply in its hands. King Log may be bad enough; but King Stork would be infinitely worse." Without pretending to discuss, or even to enumerate, the alternative schemes which have been from time to time suggested, it is observed that "the policy of leaving the water supply in the hands of the existing Companies, placing them under Parliamentary and Government control, has many advocates; but probably the plan most generally approved is that of a Water Board, composed of representatives of different popularly-elected bodies." After all, however, "the great question, so far as shareholders are concerned, relates to the terms of purchase." Our contemporary does not believe that "public opinion in this country will sanction anything in the nature of confiscation, no matter how strenuously it may be pressed by the County Council." The writer says plainly: "That the County Council is quite capable of driving a merciless and one-sided bargain everybody knows; but, at the same time, it is proper to point out that, if the ratepayers have to find the cost of these enormous purchases, their representatives are right to strain a point in protecting their interests. The Companies cannot, certainly, be allowed to fix their own price. We have no doubt they are quite as keen in making advantageous terms as the County Council has shown itself to be. The difficulty in such a case is to find any basis of agreement that is likely to be accepted by both sides." The article closes with the following remarks: "The grave fault in the County Council proposals is that they appear to ignore the principles which have operated in similar acquisitions, and set up new rules of compensation. The plain truth is that this Radical body holds opinions with regard to 'vested interests' which are certainly not those generally associated with moral conceptions. Duty to the ratepayers is one thing; but duty to just and fair principles is another and not less important thing. No honest man could defend the project for imposing on the Companies new statutory obligations, and then directing the Arbitrators to take into consideration the effect of these obligations on the revenues. . . . That arbitration will become necessary in any scheme for purchasing or transferring the rights of the Companies, may be taken for granted. Even if a Water Trust were formed, on the plan recommended by Mr. E. J. Smith, and its shares were exchanged for those of the Companies, there would still have to be some independent umpire to adjudicate upon the basis of the conversion. If we understand the objections of the Companies aright, the Council wants to have the right to shilly-shally with the question for a definite time, at the end of which, if no agreement be come to, an Arbitrator is to be brought on the scene, and tied down by instructions fatal to anything like an equitable settlement. We repeat that Parliament—even the present Parliament—is not likely to accede to any such partial and unreasonable conditions. The shareholders instead of running helter-skelter to the Stock Exchange, where the jobbers, as timid as themselves, refuse to make prices in water stocks, would act more sensibly by using all the influence they possess in securing the rejection of whatever is unjust in the County Council's Bills. For our own part, we should be glad to see these Bills rejected altogether; for the water supply of London is not the question to be dealt with by a parcel of glorified vestrymen."

The article above referred to attracted the attention of Mr. Henry Hack, M.Inst.C.E., the Engineer of the Saltley Gas-Works of the Birmingham Corporation; and last Tuesday's *Financial News* contained a letter from him thereon. As, in the debate in the House of Commons on the 22nd ult. (see *ante*, p. 428), several references were made to the terms on which the Corporation of that city acquired the gas and water undertakings, we reproduce the portion of the letter bearing upon the general question: "There is, I think, a concurrence of opinion that the water supply of our large towns and cities should be in the hands of the representative body; and that it cannot be to the interest of the citizens of London and its suburbs for the water supply to be in the hands of eight different Companies—in some districts involving duplicate mains—and the consumer saddled with the cost of eight sets of directors, offices, engineering and management staffs, most of which would be saved if the undertakings were under one management. But to acquire the privilege hitherto conferred by Parliament upon these Companies, representative bodies should be prepared to pay the full market value; and if the determination of the value be left to an Arbitrator, such Arbitrator or Arbitrators should, in all fairness between the parties, not be fettered in any way. The best experts would naturally be engaged to hear both sides; and he or they should be left to come to a conclusion upon the evidence laid before them, guided only by well-known precedents. This 'nibbling' at the Water Companies has been going on for too many years; and it is almost a reproach upon the business capacity of Londoners, that no one has been forthcoming to bring negotiations to a successful issue. Things are managed differently in Birmingham and other large provincial towns. For instance, in 1874, the purchase of the Birmingham Water and Gas Companies was set on foot by the then Mayor, now the Right Hon. Joseph Chamberlain, M.P. The following year the town was in possession of all the undertakings; Parliament having passed the Bills for their acquisition in 1875. 'How was this done so promptly?' those not in the know may ask. The reply is: 'In the fact that, apart from the great advantage the town had in the great ability and sound judgment of Mr. Chamberlain, there was no desire for confiscation, but a willingness on the part of the town to buy, and on the part of the Companies to sell, on fair and equitable terms;' the terms agreed to being, except a lump sum down for the smaller Gas Company, annuities in perpetuity (a first charge upon the local rates), of equal amount to the dividends paid by the Companies—a simple and just method of acquisition, free from all complications of compensation for prospective profits, compulsory purchase, or anything of that kind. I do not know, but I should think the Directors of the different Water Companies would consent to part with their property on similar terms. No less ought to be accepted by, or forced upon, them; any more favourable terms to the purchaser would be confiscation. The water stocks have been bought from time to time by the community, including widows and trustees, upon the faith of the parliamentary powers, at prices nearly always in accordance with the dividends paid, coupled with the value of Consols or other safe securities. At the time of the Birmingham purchase, good securities were obtainable to pay about 4 per cent. But things have changed with the issue of Goschens; it being now difficult to get safe investments to yield much, or any, over 3 per cent. It was, no doubt, due to this fact that the stocks of the Companies paying 10 per cent. were, until alarmist circulars appeared, fast approaching a market value of £300; and I think they would have reached and even surpassed that figure. The purchase of the London Water Companies ought not, therefore, to be expected to be effected for a less sum than that which, invested in safe securities, would yield to the stockholders in interest an income equal to the average of the dividends they have received over a period of years. In the case of some of the Companies, this has been 10 per cent. for a very long time. Let the County Council, or other appointed representative body who have to deal with the matter, approach this important question in a proper and businesslike manner, not ignoring, but duly recognizing, the rights and privileges conferred by Parliament upon the different Companies. Let them approach the Companies in the same spirit as Birmingham did. If this be done, I venture to say the existing state of things will soon be at an end, and London will be enjoying at an early date all the benefits which transfers of the kind have brought to Birmingham and other provincial towns."

Mr. C. H. Allison, of Bennett's Hill, Birmingham, also sent to our contemporary a letter on the same subject, in the following terms: "Having read with great interest your very able article on 'The Water Companies' Panic,' may I, as an old shareholder in the Birmingham and Staffordshire Gas Company (which was transferred to the Corporation of this city in 1875, at the same time and practically on the same terms as the undertaking of the Birmingham Water-Works Company), draw your attention to the fact that payment in both cases was based, not on capital value, but on income; that is to say, the perpetual annuities of the Corporation of Birmingham—now dealt in as Birmingham Corporation Gas and Water Annuities—were given to the shareholders to produce precisely the amounts of dividend they were then receiving; the principle being that, as investors who were satisfied with their security, they were not concerned with market prices, but solely with the amount of income they were receiving. Surely, no better basis than this could be found for the transfer of the works of the Water Companies of the Metropolis to any public body. Their right as regards back dividends, &c., would, no doubt, have to be treated as a separate question. Inasmuch as the debenture and preference stocks of the Metropolitan Water Companies have been made trustee stocks under the Trustee Investment Act of 1893, any interference with the security of these stocks would be to stultify that Act, and would destroy confidence in all trustee stocks."

The Bridlington District Council and the Water-Works.—At a largely-attended public meeting of ratepayers held at Bridlington last Tuesday, a resolution was carried, with one dissentient, sanctioning opposition by the District Council to the Water Company's Bill, and the seeking of power to purchase their undertaking. The Secretary of the Company (Mr. M. Lee) demanded a poll; and an undertaking guaranteeing the expenses thereof was entered into by four of the signatories to the requisition.

Newark Corporation and the Gas Company.—The Gas Committee of the Newark Corporation, at the monthly meeting of the Council on Monday last week, reported that the further offer they had made to the Gas Company for the purchase of their undertaking—27 years' purchase at the maximum dividend, the Company retaining their reserve fund—had been declined. It is now intended to proceed with the opposition to the Company's proposed Provisional Order; and Counsel has been engaged to represent the Corporation at the inquiry to be held to-day.

THE YORK CORPORATION AND THE WATER COMPANY'S BILL.

Important Concessions by the Company.

A Special Meeting of the York City Council, convened by requisition of several members, was held on Monday last week—the LORD MAYOR (Alderman W. M'Kay) in the chair—to further consider the action to be taken with regard to the York Water Company's Bill, which, it will be remembered, the Corporation had decided to oppose unless certain concessions, which were specified at a meeting of the Council on the 14th ult. (see *ante*, p. 384), were made by the Company.

Alderman CLAYTON, the Chairman of the Water Committee, stated that they had met that afternoon, and reported that the Company's Bill might possibly be dealt with in Committee of the House of Commons as early as the week commencing on the 10th inst.; and, in order to justify the Council in proceeding with their opposition, the Committee recommended that the Lord Mayor be requested to call a special meeting of the ratepayers at an early date to deal with the question of opposition, in accordance with the provisions of the Borough Funds Acts. This need not, however, involve the abandonment of negotiations for an arrangement; and they recommended that a small Committee be appointed for the purpose of holding a final conference with the Directors, and that unless the terms this Committee reported as being satisfactory to the Company were equally so to the Council, the opposition be proceeded with on the grounds set forth in the petition. As to the financial clauses of the Bill, the Committee recommend: "(1) That the Company be asked to produce the estimate of their proposed expenditure of £75,000; and, to the extent that the Council is satisfied that any part thereof is required for extensions, that the new capital shall be reduced within reasonable limits. (2) That the proposed rate of interest on new capital be reduced from 4 to 3½ per cent. If this is conceded, the insertion of the auction clauses not to be pressed. (3) That, in accordance with clause 8 of the petition, there be one rate of interest on new share and loan capital. (4) That new capital be raised by the issue of debenture stock; and that a sinking fund be formed in connection therewith, on the basis of the London Acts. (5) That the right to make up back dividends be restricted to a period of six years. By way of compromise on clause 14 of the petition and clause 16 in the memoranda as to purchase, your Committee suggested that the clause proposed in the memoranda might be so corrected as but to take effect within ten years from the passing of the Bill." He moved the reception of the report.

After some discussion as to what was the actual decision of the Committee in reference to the time allowed for purchase, the part of the report commencing "By way of compromise," was withdrawn.

Alderman CLAYTON thought it was better that they should withdraw the suggestion thrown out by the Committee, and so leave the purchase clause as it stood in the original.

The motion was then put, when 10 voted for it and 15 against it. It was accordingly declared lost.

The LORD MAYOR then called upon the persons who had signed the requisition to state their reasons for so doing.

Alderman WRAGGE said it was owing to the fact that at the last meeting of the Council an important resolution was carried by a majority of one, and that there were only 29 members of the Council who were able to vote. These were the two reasons given by the Chairman of the Water Committee for signing the requisition; and he (Alderman Wragge) endorsed them. He might supplement them by one more. One reason why he personally signed the requisition was that the next step would have been a very important, and probably a very expensive one. It would have been to have called a meeting of the ratepayers, with the almost sure result of a poll of the city. If it was necessary to go to that length, he would hail with every pleasure a meeting of the ratepayers on the question. But, at the same time, was it necessary or prudent to take that step without reconsidering their position? If it was desirable to go to the ratepayers, it was not desirable to do so with such a small majority as one. There was no reason why they, as reasonable men, should not take the matter into their further consideration, and, after due deliberation, say whether they were still in the same mind, and intended to go on in the course they had adopted. These were his reasons for signing the requisition; and he hoped that they would commend themselves to the Council. He moved the following resolution. "Provided that the Directors of the York New Water-Works Company agree to insert the auction clauses in their Bill, or in the alternative agree to pay no higher rate of interest on the new capital than 3½ per cent., and also to give a reduction of 5 per cent. on all present charges, except on water-closets in houses under £15 per annum, which are to be reduced to 3s. each, together with all other concessions offered and amendments agreed to by them, and also to restrict the payments of back dividends to six years, then the Council agrees, upon receiving an undertaking from the said Directors to that effect, to withdraw the petition now lodged against the Bill, and to rescind all resolutions inconsistent with the carrying out of this resolution." He said the result of the items of his resolution would be that there would be 5 per cent. on the whole of the receipts, with the exception of the water-closets in houses under £15, which they promised to reduce to a minimum charge of 3s., that would be £850; the concessions on houses under £15, £270; free water for city purposes, £166; reduction in water for the baths, £15. These concessions would come to £1301. In addition, his resolution asked the Directors to put in the auction clauses or a guarantee not to charge more than 3½ per cent. on new capital, and to limit the payment of back dividends to six years. He thought they would be wise to attempt to get all the concessions they could from the Company; but they should hesitate before they went a step farther in their opposition. They had done exceedingly well in obtaining the concessions they had; and if the Company were prepared to grant those embodied in his resolution, they would have everything needed for the welfare of the city. If they went on with the opposition, it would cost £5000 or £6000. This would mean a rate of 6d. in the pound; and this was an unfortunate position to be placed in if unsuccessful. If successful, the £5000 or £6000 would be added to the water scheme, and spread over the other payments. They had now reasonable terms; and he should advise the Corporation to stay their hands, if the Company would give them what they asked.

Mr. J. S. GRAY seconded the motion.

After some discussion,

Alderman CLAYTON said he should be willing to meet Alderman Wragge, if he would accept the following: "That such of the financial clauses as have not been conceded by the Company be insisted upon, and that the petition be proceeded with unless and until a complete agreement has been come to between this Council and the Company; and that the Lord Mayor be requested to call a meeting of the citizens at an early date." He did this in order to bring the matter before the proper tribunal—the ratepayers—who ought to decide the question.

Alderman WRAGGE said he could not accept this suggestion.

Alderman CLAYTON said in that case he would propose it as an amendment.

Mr. SHAFTOE seconded the amendment; remarking that the concessions asked for by Alderman Wragge were not sufficient.

Further discussion ensued, at the close of which the amendment was put and lost.

Some discussion then took place as to the character of the resolution, in the course of which Alderman CLAYTON urged that it should be distinctly understood that instructions should not be given for the withdrawal of the petition until all the concessions accepted by the Directors were fully embodied in the Bill to the satisfaction of the Council.

The TOWN CLERK (Mr. G. M'Guire) concurred in this view. He added that it was his duty to advise the Council that they should not retire from the position they had attained by the presentation of the petition, until they were absolutely sure that the necessary amendments were in the Company's Bill.

The Town Clerk was thereupon requested to add the condition to the resolution in writing. This was done, with the approval of the mover; and the resolution was finally altered, by the excision of the words "to withdraw the petition now lodged against the Bill," and the substitution for these words of the following: "To discontinue their active opposition to the Bill, and to withdraw their petition, when the undertaking is finally embodied in amendments to the Bill."

The resolution was passed with this alteration.

[We learn that the required concessions have been agreed to by the Directors of the Company.]

EXTENSION OF THE DUBLIN CORPORATION WATER-WORKS.

Mr. C. P. Cotton, the Engineering Inspector of the Local Government Board for Ireland, held an inquiry on the 21st ult., into an application by the Corporation for powers to take land compulsorily for the extension of the water-works. An application for sanction to a loan of £65,000, for the purpose of constructing an additional reservoir and auxiliary works, had previously been withdrawn. The case for the Corporation was opened by Mr. C. O'Connor, Q.C., who urged that this application was necessary in consequence of the low state to which the Vartry reservoir supply had sunk in 1884, 1887, and 1893; the Corporation being bound to provide against any contingency which might lose them the revenue from the townships. The present application was to furnish merely the actual ground which would be covered by a supplemental reservoir at Roundwood, to be fed by the catchment area that served the existing reservoir; and the only expense would be the acquisition of the land and the erection of a suitable dam. The amount required for the undertaking would be £65,000; and of this sum £8500 was for the acquisition of lands. Under the Corporation Act of 1893, they had power to borrow £120,000 for water-works purposes. They had only exercised their power to the extent of £42,000; so that the balance was available for the present project. The City Engineer (Mr. Spencer Harty) deposed that in 1884 the water supply was down to within eight days of the lowest possible economical draw-off. In 1887 it dropped to a few days less; and in 1893, if they had continued to supply from the Vartry alone, it would have failed altogether. It would be impossible to rely upon the Roundwood reservoir for a sufficiency of supply in a few years, unless they increased the present source of supply. They proposed to put the main embankment above the upper end of the present reservoir, and to flood back the lands from that up north-east; taking 509 acres of ground altogether, of which 300 acres would be under water. The total contents of the reservoir would be 1226 million gallons; so that the two reservoirs would contain 271 days' supply at the rate of 16 million gallons a day. The present storage gave about 120 days' supply. They merely proposed to further utilize the present catchment area; and there were no riparian rights to be purchased. The average daily supply in 1894, was something under 11½ million gallons. In the dry season, they had been distributing 14½ million gallons; while in wet periods it was 10½ millions. At this stage, Mr. Goddard, on behalf of the Ratepayers' Association, applied for an adjournment, on the ground that they were taken by surprise, as they understood that the inquiry was withdrawn. If they had known the inquiry was proceeding, they would have been represented by Counsel. After discussing the matter, Mr. Cotton decided that he could not adjourn without the consent of the Corporation. The next witness, in support of the application, was Mr. L. L. Macassey, who deposed that in January and February, 1893, above 2000 million gallons of water went to waste over the weir. Had the Corporation the means of stopping that, such as was now proposed, it would have carried the city completely over the dry period. He was satisfied the work could be done within the estimate. Mr. J. T. Hurford also gave evidence; and a statement by the Right Hon. the Lord Mayor concluded the proceedings.

The Merthyr Tydfil Water Bill.—The Chairman of Committees of the House of Lords (Earl Morley) has granted a period of 50 years instead of 40 years as specified in the Bill, for the repayment of the money to be borrowed under it.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Edinburgh and Leith Gas Commissioners held a meeting on Monday, at which the gratifying announcement was made by Bailie Kinloch Anderson that there had been an increase in the output of gas during January of more than 18 million cubic feet, and that since May 16 the total increase had been nearly 56 million cubic feet. The January increase was the largest they had had for a very long time. He thought that the cheapness of the gas was the first cause of more of it being used; because there were more gas fires and cookers employed, and a larger amount was being used for motive power. He referred to the works for the introduction of electric lighting, and said that they had led to a great number of leakages of gas; and he feared that their leakage this year would be found to be larger than usual, on that account. A great deal of expense had been caused to the Commissioners in connection, not only with the repairing of the leakages, but also in the keeping of a staff of men going about trying to find out where the leaks were. He hoped that further operations would be carried out a little more carefully. There is no doubt that the electric lighting works have been pushed forward at a rapid rate, in contrast to the tardy action of the Corporation in taking up the subject. But even with all the haste which has been displayed, the time originally fixed for turning on the light, which no one who knew anything of the subject outside the Corporation Committee ever thought possible, has long passed. The second date which was fixed—about March—has now come; and there is as yet no word of the opening ceremony. Indeed, nothing has yet been done to place lamps on the streets which are to be lit by electricity; and there is consequently every appearance that the lighting season will be past before the citizens will have an opportunity of seeing the effect of the new light. It is a curious coincidence that, in Scotland at least, there has not yet been one installation which has been timed to be ready for the winter season. Whatever may be the cause, the effect is that the department are able to feel their way into business gradually; being able to run their plant at an easy rate during the summer months. There is the probability of another effect of the delay in introducing the electric light, which I gather from an advertisement appearing to-day, intimating that the Incandescent Gas-Light Company are about to reduce the price of their lamps from 15s. to 10s. 6d. There has been a great demand for these lamps in all the large towns; but the Company possess the advantage in Edinburgh of having got the start of the Electric Lighting Committee. There is likely to be a spurt given by the reduction in price to the sale of incandescent gas-lamps; and by the time the electric light is turned on, it will be to a large extent forestalled.

At the meeting of the Commission on Monday, a letter was read from the Secretary of the Incorporated Gas Institute, calling the attention of the Commissioners to the fact that their annual meeting is to be held in Edinburgh in June next, under the presidency of Mr. R. Mitchell, and suggesting that the Commissioners might give the meeting official recognition The subject was sent to a small Committee to consider; Bailie Kinloch Anderson remarking that he thought they would require to do something in the matter. The Corporation and the Gas Commissioners may unite to provide an entertainment on one of the evenings of the meeting. In Edinburgh, the customary entertainment which is given is a conversazione in the Museum of Science and Art, or, if the company be not a large one, in the Music Hall. In the event of the latter building being selected, dancing is part of the programme. Such an entertainment was given to the Institute of Journalists at their annual conference in 1892; and it was a pronounced success—lady members voting it a much more rational style of amusement than the grosser pleasures of a dinner. Whatever form the entertainment may take, I think I may say that Lord Provost M'Donald, whose first year of office this is, is favourably disposed to the proposal, and that he is likely to see that something quite suitable is provided.

With regard to the meeting in June, I may say that Mr. Mitchell's health, which has not been very robust during the winter, is now a good deal better. This will be welcome information to the members of the Institute. I learn casually that more than one member of the North British Association of Gas Managers has, I suppose on account of the harassments of the past two months, been laid up with sickness of the influenza type; but they are now recovered, and able to attend to their duties again.

The frost dies hard. Although, as a rule, during the week the weather has been bright and mild, there have been a few degrees of frost every night; and the consequence is that, while gas supplies are coming back to their normal, there is little improvement to chronicle regarding water supplies, which are still being distributed from standpipes in the streets or from water-carts. The dearth of water is by no means confined to the poorer classes of occupiers. I hear of first-class mansions in which there has not been a drop of water, except what the servants have fetched from the street, since Jan. 19. In gravelly soil, the ground has been found, at Musselburgh, which is on the seashore, to be frozen to a depth of 37 inches. At present, the North British Railway Company are laying a new 30-inch gas-main for the Edinburgh and Leith Gas Commissioners, in lieu of one which is to be taken up in connection with the reconstruction of the Waverley Station. The work has, of necessity, to be done at once; the Town Council requiring the main to be laid in Cockburn Street before the companion thoroughfare of the North Bridge is interfered with. But expedition is a thing which cannot be commanded, for the ground is so hard that it has taken three weeks to lay about 50 yards of pipe. At the present rate of progress, it will be about other five weeks before the workmen get out of Cockburn Street.

A correspondent wrote the other day in the *Glasgow Herald*, asking if anyone could tell him how oil gas had behaved in the severe weather. No reply has yet been given. From my own inquiries, however, I learn that the subject has not been lost sight of; and that it is likely that a statement upon it will be made public soon. In the meantime, speaking of the Peebles process, which is the one most extensively in use (being now, I am told, at work in 30 gas-works in the United Kingdom), I understand that it has come out as victorious from this severe test as it has from all the other trials to which it has been subjected.*

Speaking of oil, I observe that Mr. Alex. Bell, the Manager of the Dalkeith Gas-Works, presided at a lecture which was delivered there on Tuesday night, by Mr. John Gray, Manager of the Clippens Oil-Works, on the subject of the flash-point of mineral oils. Mr. Bell pointed out the anomaly of Government requiring the flash-point of oils used in the War Department to be 104°, and for lighthouse purposes 150°; while they allow oil to be sold for general use, of 73°. The lecturer supported the Chairman's views, and characterized the Government arrangement as to the flash-point as bungling.

It will be remembered that the Police Commissioners of Gourock were the means of getting an amendment made upon section 18 of the Burghs Gas Supply (Scotland) Act, in 1893, to the effect of restricting the provision that before commencing works for the manufacture or storage of gas, the Commissioners should obtain the consent of the owner, lessee, and occupier of every dwelling-house within 300 yards of the site of such works, by substituting for it the provision that application must be made by the Commissioners to the Sheriff, for an inquiry as to whether or not consent may be dispensed with. The Commissioners are the first to put the Act, as amended, into force. They are about to erect a new gasholder; and they have made the requisite application to the Sheriff of the county, who has fixed the 11th inst. as the date of the inquiry. The proposal is to erect the gasholder in Royal Street; and it has, as can be easily supposed, aroused opposition among a section of the community, chiefly on the ground that the site is unsuitable, although the cost is also objected to. A meeting of feuars and ratepayers was held on Thursday night, at which it was resolved, though not quite unanimously, to appear before the Sheriff and oppose the application of the Gas Commissioners.

An action was at proof before Lord Kyllachy in the Court of Session at Edinburgh on Thursday, in which the Magistrates of Glasgow seek to recover from David Ireland and Son, coal exporters, of Dundee, £240, the price of a cargo of coke. The coke was shipped at Grangemouth for Hamburg, but was rejected by the purchaser from Ireland and Son, who sold it by auction, and who now say they are not liable for the contract price on the ground that the coke did not conform to sample. A sample ton, they say, was sent from the Glasgow Corporation Gas Department direct to the buyer in Hamburg, with whom the defenders expected to do business. The defenders say they never saw that sample, and therefore they could not have checked the cargo; but that their buyer, when he looked at the cargo, would not take delivery of it. The price realized, they say, was insufficient to cover even the freight. The allegation of the defenders is that the coke must have been made from an inferior class of coal to that from which the sample came. In his evidence, Mr. W. Foulis, the Gas Engineer to the Corporation, said they mixed all the coal together before using; and that practically the same quality of coal was employed in all their works. Shale was used to some extent, but by itself, and not mixed with the other coal. Mr. F. T. C. Linton, of Leith, and Mr. G. R. Hislop, of Paisley, were also examined on behalf of the Corporation. Judgment has not yet been given; and it may be some time before it is, as there is a proposal to have the action sisted till one which the defenders have raised against their buyer in the German Courts is disposed of.

Mr. John M'Crae, Manager of the Dundee Corporation Gas-Works, gave a lecture on "Coal Gas Manufacture" before the Dundee and North of Scotland Institute of Mechanical Engineers, on Thursday night. In the course of his remarks, he dealt rather roughly with the dry meter, in the accuracy of which as a recording instrument he is not a believer.

This week only one case of gas poisoning falls to be recorded in Glasgow. It occurred in the east end of the city, and was discovered last Saturday. A lady and her two nieces were affected, but happily not seriously. As in a number of the other cases which have occurred, no gas was used in the house in which the people live.

Explosions of gas caused by the frost have also gone down; all that I have been unable to discover being a very trifling one in Brechin, caused by a woman inspecting a frozen and fractured gas-meter by the aid of a lighted candle. I may have to modify the opening statement of this paragraph, for last night the Theatre Royal in Glasgow was burned down; and the fire is attributed by the manager to, in all probability, an escape of gas. It broke out at the prompter's side of the stage, where there is a gas-light. Some workmen had just finished working on the stage, and had left; and only one or two cleaners were in the building. One of them is said to have heard a loud report just before the fire was discovered. The theatre is lighted with electric light; but it is not stated whether any part of the building was lit up at the time. If so, that is as likely to have been the cause of the fire as anything else, for, on the workmen leaving, a number of the lights would be switched off, throwing a greater current upon those left on, which would most probably be about the prompter's box. There is also the probability of matches having been used by the workmen—the most likely supposition of all. But, of course, gas explosions are popular; and that theory has caught on in the meantime. I consider it the least probable, because the workmen about the stage would have been aware if there had been an escape of gas, which must have been going on for some time before an explosive mixture could have been produced. A gas-jet may have set light to something, and caused the fire, without an explosion. If it should be established that it was a gas explosion, it will have been a disastrous one, for the damage done is estimated at over £20,000.

It is proposed by the Broughty Ferry Gas Commissioners, to expend £346 upon the construction of a new access to the gas-works, by which a considerable saving in cartage will be effected. The Commissioners also have in view the erection of two new ovens of retorts, in settings of eights, at a cost of £563.

The spot price of sulphate of ammonia is reported to be £11 5s. per ton, with a firm market.

---

* A letter on this subject, from Mr. S. Glover, of St. Helens, appears in our "Correspondence" columns to-day.—ED. J.G.L.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *March* 2.

Sulphate of Ammonia.—The improved tone last noticed has further developed; and, there being an increased inquiry from most consuming quarters, values are again firmer. Parcels offered have, therefore, moved off very freely; and there does not appear to be anything in the way to check a further rise, unless it be that dealers hold orders which are expected to come on the market in regular course. The quotations are to-day £11 7s. 6d. f.o.b. at the ports. Forward sales are almost entirely confined to Leith delivery; but the actual business passing is not large—the value being £11 10s. to £11 12s. 6d. for six months' contracts. In consequence of delayed arrivals of nitrate vessels through unfavourable winds, an impetus has been given to the market; and the price on spot has been raised to 9s. per cwt.

LONDON, *March* 2.

Tar Products.—In consequence of the large quantity of benzol now being used for gas enrichment, there is undoubtedly a better inquiry for this article from aniline makers, who had held off the market expecting to see benzols go much lower. It seems pretty sure that prices will not be weaker, though it is difficult to see how any important advance can come about. A fair business is being done in pitch for forward delivery; but at from 2s. to 3s. below to-day's price. Carbolic acid does not realize the price fixed by the Committee; and to meet the market requirements, they have lowered the quotation 2d. per gallon. Considerable business has been done at the new price. Creosote and common tar oils are dull, and somewhat difficult to sell. Anthracene is held for Committee's prices, but very little business is reported. Solvent naphtha is a drug on the market and unsaleable. Transactions during the week have marked the following prices: Tar, 18s. to 21s. 6d. Pitch, 32s. 6d. Benzols, 90's, 1s. 1d.; 50's, 1s. 0½d. Solvent naphtha, nominal, 1s. 1d. Toluol, 1s. 3d. Crude, 30 per cent., naphtha, 4½d. Creosote, liquid, 2d.; ordinary, 1⅞d.; salts, 20s. Cresylic acid, nominal, 1s. Carbolic acid, 60's, 1s. 6½d. Anthracene, "A," 1s. 1d.; "B," 10½d.

Sulphate of Ammonia.—Owing to the icebound condition of the north-east Continental ports, there is considerable delay in shipping contracts. Price has ruled steadily during the week from £11 5s. to £11 7s. 6d., less 3¼ per cent., according to port of shipment; the higher figure being only obtainable in London, usual Beckton terms. Gas liquor is quoted at 7s. 6d. to 9s. 6d. per ton.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—The break-up of the frost has necessarily brought with it some quietening down in the demand for round coals; and pits generally have again got on to four and five days per week, with an output ample for requirements. Business doing, however, is being still further considerably checked by the revised and increased demurrage charges which the railway companies have put in force this month upon loaded waggons lying in the sidings. Merchants who have hitherto been in the habit of stocking large quantities of coal in the railway sidings in their respective districts, necessarily are, in view of the increased charges, chary about buying beyond what they know they absolutely require; and this has resulted in restricting business to very much of a hand-to-mouth character. For round coals, prices remain without quotable change. Best Wigan Arley coals are still quoted at 10s. 6d. to 11s. per ton at the pit mouth; Pemberton four-feet and seconds Arley, 9s. 6d. to 10s.; common house coals, 7s. 6d. to 8s.; and steam and forge qualities, 6s. 6d. to 7s. For engine fuel, there has been a fairly good demand; and with the lessened requirements for house coals, the better qualities of slack are not quite so plentiful, and prices have slightly stiffened, in some cases about 3d. per ton. Common engine fuel remains at about 3s. 6d. to 4s. per ton; but best qualities are now being quoted from 4s. 6d. to 5s. and 5s. 3d. For shipping, there is a fairly active demand, with Lancashire steam coal, delivered at the Garston Docks or the High Level, Liverpool, fetching about 8s. to 8s. 6d. per ton.

Northern Coal Trade.—The continuance of cold and frosty weather has maintained the demand for fuel, especially for gas and household coal; but the supply has been large, and fully up to all the requirements. There is also another disturbing element, and that is the fear that is now entertained that there will be at the end of March a stoppage in the South Wales collieries through a great labour dispute; and this fear has enlarged the demand for steam coals, as some of the coaling stations desire to enlarge their stocks. Best Northumbrian steam coals are rather higher for forward deliveries; but for prompt sale, they are still quoted at 8s. 9d. per ton f.o.b., whilst steam smalls are 3s. to 3s. 3d. Many of the collieries have only partial orders; but the time worked is not so short as it was. In the gas coal trade, the deliveries continue very heavy—far above the usual demand at this season. Prices are still quoted 6s. 9d. to 7s. 3d. per ton f.o.b. for best Durham gas coals; and orders are keenly competed for. There is very little alteration in the household coal trade; but the demand is scarcely so large as it was, and the price is on the basis of about 10s. to 11s. 6d. per ton f.o.b. Manufacturing coals are quiet in price; but the consumption is larger, many of the shipbuilding yards having now got to work again. Coke shows an increased demand for export; but for the home trade, the requirements are limited. The price is still from 13s. to 14s. per ton f.o.b. for best Durham qualities. Gas coke is steady in price, for though the production is above the average at this season of the year, yet there is an enlarged export; and the local consumption is also very well maintained.

Scotch Coal Trade.—There is little change in the coal trade in Scotland. There is a very fair amount of business of the prompt nature going, and a tendency to a check in the downward course of prices; arising partly from the expectation, which is still cherished, that there may be a stoppage of work in Wales, and partly from the prospect of shipments to Baltic ports being soon resumed. A conference was held at Dunfermline on Saturday, between representatives of the masters and men, on the subject of wages; but nothing was done, the meeting being adjourned for a fortnight. The impression gains ground that wages will not be disturbed. There is much dissatisfaction at the Danish railway contract for over 40,000 tons having gone to Wales, although the Scotch tenders were from 3d. to 6d. per ton lower. The Scotch offerers insisted on the insertion of a strike clause in the contract, which is believed to have sent the contract away from them. There are large stocks of coal on hand. Splint is particularly plentiful; and it is the only variety in which rates can be said to be easier than they were a week ago. The prices quoted are: Main, 6s. to 6s. 3d. per ton f.o.b. Glasgow; ell, 7s.; splint, 6s. 6d. to 6s. 9d.; and steam, 7s. 9d. to 8s. The shipments for the week amounted to 94,526 tons—an increase on the preceding week of 129 tons, but a decrease as compared with the quantity in the corresponding week of last year of 42,967 tons. For the year to date, the total shipments have amounted to 757,146 tons, a decrease upon the quantity in the same period of last year of 272,570 tons.

Accident to a Cookery Teacher.—Owing, it is supposed, to the gas not having been properly turned off at a gas-stove after a previous lecture, a lady cookery demonstrator at the Lostwithiel Cookery School lately sustained injuries to her face in consequence of an explosion occurring when she went to light the stove for a demonstration. She was fortunately not seriously hurt; but several engagements had to be relinquished.

New Joint-Stock Companies.—The Universal Gas Light and Fuel Syndicate, Limited, has been registered with a capital of £30,000, in £1 shares, to carry on business as colliery proprietors, gas makers and suppliers, coke makers, miners and smelters, chemical manufacturers, steel converters, ironfounders, &c. "Incandescer, Limited," is the title of a Company formed with a capital of £4000, in £1 shares, to carry into effect two agreements—the first, made Feb. 25, 1895, by the Company with F. H. Medhurst; the second, bearing the same date, made by the Company with D. C. Defries and F. H. Medhurst—to acquire certain patents for improvements in the manufacture of gas and oil lamps and burners, and to develop and turn them to account.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 477.)

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	11 Oct.	10½	Alliance & Dublin 10 p. c.	10	21—22	..	4 15 6
100,000	10	,,	7½	Do. 7 p. c.	10	14—15	..	5 0 0
300,000	100	2 Jan.	5	Australian (Sydney) 5% Deb.	100	105—107	..	4 13 4
200,000	5	14 Nov.	6½	Bombay, Limited	5	6¼—6¾	..	4 16 5
40,000	5	,,	6½	Do. New	4	4⅛—5	..	5 4 0
380,000	Stck.	28 Feb.	11½	Brentford Consolidated	100	243—248*	+6½	4 12 8
180,000	,,	,,	8½	Do. New	100	195—200*	+8½	4 5 0
220,000	Stck.	28 Sept.	11	Brighton & Hove Original	100	225—230	+2	4 15 8
888,500	Stck.	28 Feb.	5	Bristol	100	115—117*	+1	4 3 6
320,000	20	28 Sept.	11½	British	20	50—51	..	4 8 2
50,000	10	30 Aug.	11½	Bromley, Ordinary 10 p. c.	10	21½—22½	..	5 2 2
51,510	10	,,	8½	Do. 7 p. c.	10	16½—17½	..	4 17 2
328,750	10	14 Nov.	2	Buenos Ayres (New) Limited	10	6—6¼	..	3 1 6
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	100—103	..	5 16 7
150,000	20	28 Feb.	8½	Cagliari, Limited	20	26¼—27¾*	..	6 0 0
550,000	Stck.	11 Oct.	13	Commercial, Old Stock	100	282—287	+2	4 10 7
165,000	,,	,,	10	Do. New do.	100	207—212	..	4 14 2
160,762	,,	13 Dec.	4½	Do. 4½ p. c. Deb. do.	100	130—135	..	3 6 8
800,000	Stck.	13 Dec.	13	Continental Union, Limited.	100	245—250	+2	5 4 0
200,000	,,	,,	10	Do. 7 p. c. Pref.	100	205—210	..	4 15 3
535,000	Stck.	28 Feb.	5½	Crystal Palace Ord. 5 p. c. Stk	100	115—120*	+½	4 7 6
486,090	10	31 Jan.	11	European, Limited	10	24—25	..	4 8 0
354,060	10	,,	11	Do. Partly paid	7½	16¾—17½	..	4 14 3
5,646,590	Stck.	14 Feb.	12	Gaslight & Coke, A, Ordinary	100	267—272	−2	4 8 3
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	105—110	..	3 12 9
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	275—280	..	3 11 5
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	130—135	..	3 14 1
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	197—202	..	3 14 3
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	100	183—188	..	3 14 6
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	275—280	+2	3 11 5
476,000	,,	,,	6	Do. K, 6 p. c. Prf..	100	163—168	..	3 11 5
1,061,150	,,	13 Dec.	4	Do. 4 p. c. Deb. Stk.	100	127—130	..	3 1 6
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	140—145	..	3 2 1
908,000	,,	,,	6	Do. 6 p. c. do.	100	188—192	..	3 2 6
3,800,000	Stck.	14 Nov.	12	Imperial Continental	100	237—242	−2	4 19 2
75,000	5	13 Dec.	6	Malta & Mediterranean, Ltd.	5	5¾—6¼	..	4 16 0
560,000	100	1 Oct.	5	Met.of Melbourne, 5 p.c. Deb.	100	111—113	..	4 8 6
541,920	20	14 Nov.	5	Monte Video, Limited	20	15⅝—16⅜	..	6 1 2
150,000	5	29 Nov.	8	Oriental, Limited	5	7—7¼	..	5 6 8
60,000	5	13 Sept.	7	Ottoman, Limited	5	4¾—4⅞	..	7 7 4
166,870	10	14 Feb.	2	Para, Limited	10	1¾—2¼	..	8 0 0
420,000	100	2 Nov.	6	People's Gas of Chicago—1st Mtg. Bds.	100	105—109	..	5 10 1
500,000	100	1 Dec.	6	2nd Do.	100	102—107	..	5 12 1
150,000	10	11 Oct.	6	San Paulo, Limited	10	8¾—9¼	..	6 6 4
500,000	Stck.	14 Feb.	15½	South Metropolitan, A Stock	100	350—360	+5	4 6 1
1,350,000	,,	,,	12	Do. B do.	100	292—297	..	4 0 10
290,000	,,	,,	13	Do. C do.	100	305—310	..	4 3 10
775,000	,,	16 Jan.	5	Do. 5 p. c. Deb. Stk.	100	167—172	..	2 18 2
60,000	Stck.	28 Feb.	11½	Tottenham & Edm'nton, "A"	100	225—230*	+5	5 0 0
				WATER COMPANIES.				
746,021	Stck.	28 Dec.	10½	Chelsea, Ordinary	100	280—285	−2½	3 11 0
1,719,514	Stck.	11 Oct.	8	East London, Ordinary	100	219—224	−1	3 11 5
651,740	,,	28 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	147—152	..	2 19 2
700,000	50	13 Dec.	8¾	Grand Junction	50	113—117	+1	3 12 6
708,000	Stck.	14 Feb.	12	Kent	100	300—310	+2½	3 17 5
1,043,800	100	28 Dec.	9½	Lambeth, 10 p. c. max.	100	258—263	−2	3 12 3
406,200	100	,,	7½	Do. 7½ p. c. max.	100	202—206	+1½	3 12 10
330,000	Stck.	28 Sept.	4	Do. 4 p. c. Deb. Stk.	100	130—135	..	2 19 3
500,000	100	14 Feb.	12½	New River, New Shares	100	380—385	−5	3 6 2
1,000,000	Stck.	31 Jan.	4	Do. 4 p. c. Deb. Stk.	100	136—140	−½	2 17 2
902,300	Stck.	13 Dec.	6	S'thwk & V'xhall, 10 p.c. max.	100	150—155	−2	3 17 5
126,500	100	,,	6	Do. D 7½ p.c. do.	100	148—153	−6	3 18 5
1,155,066	Stck.	13 Dec.	10	West Middlesex	100	270—275	..	3 12 9

*Ex div.

Gas Exhibition at Tunbridge Wells.—Last Tuesday, there was opened, in the Royal Sussex Assembly Rooms, Tunbridge Wells, a local gas and general trades exhibition, at which Messrs. Richmond and Co., Limited, of Warrington, were the principal exhibitors. The inaugural ceremony was performed by the Deputy-Mayor (Mr. Alderman Cronk), who was accompanied by Mr. E. W. T. Richmond, in the presence a large assembly. In the course of his remarks on the value of similar exhibitions in making known the economy of gas cooking-stoves, he stated, as a proof of the appreciation in which they were held in Tunbridge Wells, that at Christmas, 1893, the Gas Company had put in 1481, whereas at the same period last year the number in use was 1988. This was an increase of more than 500 stoves in one year; and it was sufficient testimony of their value. It was an interesting thing to know that out of these 500 stoves, no less than 240 had been put into houses on the "penny-in-the-slot" system. Mr. Richmond having briefly thanked Alderman Cronk, the exhibition was declared open. The firm showed an excellent collection of stoves; one of the latest additions to their list being the "Universal" cooker, which is on the prepayment system, and is recommended as being in several important respects—notably in economy, cleanliness, and safety—an improvement upon their "National" cooker. Besides stoves, there were on view gas burners and fittings, water-heaters, &c.; and there was a display of the Welsbach incandescent system of gas lighting by a local tradesman. During the past week, cookery lectures were delivered twice daily by Miss Owen and Miss Shekleton, and they were largely patronized. Humorous lantern views, illustrating gas *versus* coal as a fuel, were shown. The exhibition was so thoroughly successful, that it is to be kept open till next Thursday.

The Price of Gas at Bexley Heath.—At a meeting of the Bexley Heath Ratepayers' Association last Wednesday, Mr. E. Whomes submitted an account of the communications which had passed between him and the West Kent Gas Company on the subject of the price of gas. He said he first wrote to the Company on the 7th of December last, stating that 200 consumers had signed a petition requesting a reduction in the charge, and asking the Company to receive a deputation. To that letter the Company's Secretary (Mr. R. P. Keys) had replied, pointing out that more than one-third of the Company's consumers were getting gas at 3s. 4d. per 1000 cubic feet, while those of three-fourths of the companies in Scotland paid from 4s. 7d. up to 25s., and half those in Wales paid from 4s. 6d. up to 10s. Mr. Whomes replied to this that if, as Mr. Keys had stated, one-third of the consumers had their gas for 3s. 4d. per 1000 cubic feet, they were more favourably treated than the remaining two-thirds, who paid 4s. 6d. A further letter was received from Mr. Keys, stating that the Association's request to be supplied with gas upon their own terms, and at their own price, could not be entertained; for the simple reason that they were asking the Board to do an impossibility. Mr. Savery characterized Mr. Keys' language as "very rude." He thought if the Company could afford to sell some gas at 3s. 4d. per 1000 cubic feet, they could sell all at this price. Mr. Whomes explained, in answer to a question, that 4s. 6d. per 1000 cubic feet was charged for gas burned up to a certain quantity, and 3s. 4d. for all beyond that. Mr. Savery called attention to the fact that there was a stream running to waste, sufficient to light the town with electricity; and he thought that the District Council should be approached on the subject. Mr. Callow moved that the matter be referred to the Lighting Committee, with a view to the District Council being interviewed on the matter. This was unanimously agreed to.

Projected Abolition of Gas-Meter Rents at Leicester.—The Gas Committee of the Leicester Corporation have announced their decision to abolish gas-meter rents. This concession will, it is estimated, reduce the yearly income of the Gas Department by about £3000.

Sales of Shares.—At Spalding last Tuesday, Messrs. S. and G. Kingston sold by auction a number of £10 shares in the *Spalding Water Company* at £11 each.——On the following day, at Norton (Malton), Messrs. Boulton and Cooper sold six £10 fully-paid shares in the *Filey Gas and Water Company*, for £12 12s. 6d. apiece.

A Gas Poisoning Case in Brompton.—On Sunday, the 24th ult., a man and a woman were found in an unconscious state in a room at No. 41, St. Oswald Road, Brompton; the apartment, at the time the discovery was made, being full of gas. Medical aid was at once summoned; but animation could not be restored in the woman. Her companion was removed to St. George's Hospital, where, under treatment, he recovered. An inquiry into the circumstances was held last Wednesday by Mr. C. Luxmore Drew, when an opinion was expressed that the deceased, before retiring to bed, had probably pulled the chandelier down too far, and so allowed sufficient gas to escape to fill the room. As there was nothing of a suspicious character, the jury returned a verdict of "Accidental death."

Opposition to the North Middlesex Gas Bill.—A statutory meeting of the ratepayers of Finchley was held on Monday evening last week, at the National Schools, Finchley, to pass a resolution authorizing the District Council to oppose the Bill promoted by the North Middlesex Gas Company. Mr. Goodyear, Chairman of the Council, presided, and, in explaining the position, said the Company had lighting powers over two-thirds of the district of Finchley, and charged 4s. 3d. per 1000 cubic feet. Against this, the charges of other gas companies to private consumers in the district were: Colney Hatch, 4s. 2d.; Barnet District, 4s.; The Gaslight and Coke Company, 3s. 1d. He moved—"That it is expedient, for the purpose of protecting the interest of the district of Finchley and of the consumers of gas there, and the ratepayers generally, that the Bill introduced into Parliament, intituled a Bill for incorporating and conferring powers on the North Middlesex Gas Company, should be opposed; but that, in the event of any such Bill passing into law, proper powers and provisions should be inserted for the protection of the District Council, consumers, and ratepayers; and that the expenses of such opposition be paid out of general district rates." This was seconded by Mr. C. F. Jones, who said that the present capital of the Company was £45,000; and, under the Bill, they sought to increase it to £100,000. The Company asked that 10 per cent. should be allowed as the maximum dividend on the old capital; but to this the Special Committee, of which he was Chairman, objected, as from 5 to 7 per cent. were the prices now prevailing. According to the Bill, 14-candle gas was to be the minimum power. But the Ratepayers' Committee and others asked for 16-candle power; and they considered further that the testing-station should be erected by the Company at the offices of the District Council. The Company asked 4s. 9d. to be fixed as the maximum price per 1000 cubic feet; but the Committee considered that it should be 3s. 6d. with a sliding-scale. If they could get the reduction asked, it would show a saving on 54 million cubic feet (the gross make at present) of £2025 per annum, or in 20 years a saving of £40,000 to the gas consumers of Finchley and Hendon. In the result, the resolution was carried by 69 votes to 5. A petition in support of the opposition is being drawn up; and Counsel have been instructed to oppose the Bill on behalf of the Local Authority.

GWYNNE & BEALE'S
PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 2698.

GWYNNE & CO.,

HYDRAULIC AND GAS ENGINEERS,

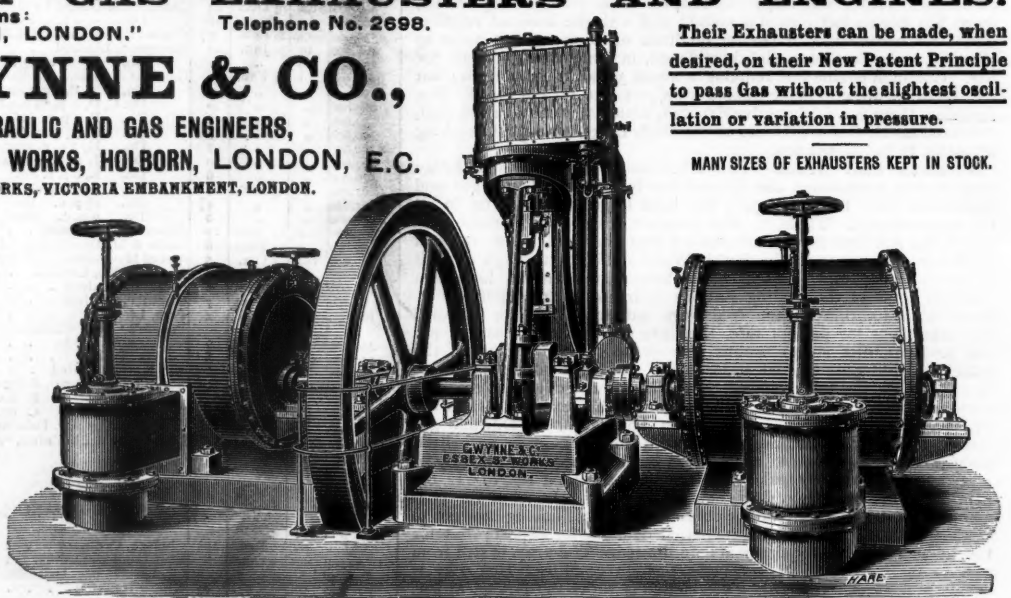
BROOKE STREET WORKS, HOLBORN, LONDON, E.C.

Late ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON.

They have completed Exhausters to the extent of 32,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, PATENT RETORT-LIDS, STEAM, PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.



Their Exhausters can be made, when desired, on their New Patent Principle to pass Gas without the slightest oscillation or variation in pressure.

MANY SIZES OF EXHAUSTERS KEPT IN STOCK.

Exhausting Machinery at Fulham and Bromley Gas-Works, London—each set passing 400,000 cub. ft. per hour drawing 14 miles distant from Beckton.

Catalogues and Testimonials sent on application.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS, should be received not later than the FIRST POST on SATURDAY.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.

JOHN WM. O'NEILL, Managing Director,
Palmerston Buildings, Old Broad Street, London, E.C.

ANDREW STEPHENSON, AGENT. All communications re Oxide to be addressed to Palmerston Buildings.

WINKELMANN'S "VOLCANIC" CEMENT. Fire Resistance up to 4500° Fahr. In use in most Continental Gas-Works, and in more than 300 British Gas-Works.

ANDREW STEPHENSON,
182, GRESHAM HOUSE,
OLD BROAD STREET,
LONDON, E.C.

Telegrams: "Volcanism, London."

AMMONIACAL LIQUOR Wanted.
BROTHERTON AND Co., Ammonia Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

GAS TAR Wanted.
BROTHERTON AND Co., Tar Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SPENT OXIDE Wanted.
BROTHERTON AND Co., Chemical Manufacturers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

BROTHERTON & CO.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

WANTED, a Situation as Meter- INSPECTOR or otherwise by a thoroughly practical Meter Maker. Experienced in Wet and Dry and Prepayment Meters. For several Years Foreman at a Provincial Meter-Works. Highest References. Total Abstainer.
Apply, by letter, to No. 2484, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GENTLEMAN, with large connection, and having Representatives calling upon the principal Gas Companies in the Kingdom, is open to undertake the REPRESENTATION of ENGINEERING and GAS-WORKS REQUIREMENTS, either as Buying Agent or upon Commission.
Apply, by letter, to No. 2494, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Advertiser (aged 38), at present Engineer and Manager of medium-sized Gas-Works, desires a remunerative position abroad. One in which he will have full scope for his talents and energy. He has produced first-class carbonizing and general working results, has a knowledge of several Languages, and can furnish good Testimonials or References.
Please address No. 2481, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO ENGINEERS.

WANTED, a Maker to manufacture and develop an improved Charging-Machine for Gas-Retorts. The idea could be shown in practice in any Workshop.
Apply, by letter, to No. 2492, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Working Manager to undertake the duties of a small Gas-Works making 5¼ millions per annum. Railway Station within 30 miles of North side of London. Wages 26s. per Week, with House, Coal, Gas, and Garden.
Applications, with testimonials, stating age, &c., to be addressed to No. 2495, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TAUNTON GASLIGHT AND COKE COMPANY.

WANTED, good Man as Smith and MAIN AND SERVICE LAYER. Permanent Situation. Only those with first-class references need apply.
Applications, stating Wages required, to be forwarded to A. EDWARDS, SECRETARY AND MANAGER.
Feb. 28, 1895.

THOROUGHLY qualified Assistant MANAGER required immediately for a Provincial Gas-Works (150 Millions). Must be a good Carbonizer, able to make Referee's and other Tests, and used to the control of workmen. House, Coal, and Gas provided.
Apply, by letter, stating Salary required, and enclosing *Copies only* of Testimonials, to No. 2493, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

RAUNDS GAS-WORKS, THRAPSTON, NORTH HANTS.

WANTED, a competent Manager to take charge of the above Works on May 1, 1895. Annual make of Gas about 2¾ Millions. Assistance given during the winter months.
Terms 25s. per week, with good House, Gas, and Fuel.
Apply, on or before March 30, 1895, to Mr. E. J. WHITNEY, Secretary, Gas Company, Raunds, Thrapston, NORTH HANTS.

W. C. HOLMES & CO., Huddersfield; AND 80, CANNON STREET, LONDON,
Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also Improved Patent Rotary Scrubber-Washers.
*** See Advertisement p. III., centre of JOURNAL.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Address: "Braddock Oldham."

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, Leeds, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

SPECIAL PAINT FOR GAS-WORKS.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1759.

GAS PLANT CEMENT.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

AMMONIA SATURATORS.

WALTER THOMASON and SONS, Chemical Plumbers, &c., and Makers of Lead Saturators, &c., 21, WESTON STREET, BOLTON. Repairs of every description.
Please write for Estimate before ordering elsewhere.

PATENTS FOR INVENTIONS.

J. C. CHAPMAN, M.I.M.E. and Fel. Chartered Inst. Patent Agents. ADVICE ON ALL MATTERS CONNECTED WITH ABOVE.
Information and Handbook on application.
70, CHANCERY LANE, LONDON, W.C.

SADLER AND CO., LIMITED, MIDDLESBROUGH; ULVERSTON (BARROW); PORTSMOUTH; CARLTON; STOCKTON; 315, St. Vincent Street, GLASGOW; and 85, Water Street, NEW YORK. Tar Distillers, Manufacturers of all TAR PRODUCTS, ALIZARINE and other TAR COLOURS, BICHROMES, OXALIC ACID, ALKALIES, LIQUOR AMMONIA, AMMONIA SULPHATE, &c.
Head Office: MIDDLESBROUGH. Correspondence invited.

WANTED, Persons with connection to CALL ON GAS COMPANIES for the Sale of Article in daily use.
State, by letter, Locality and Remuneration expected to No. 2477, care of Mr. King, 1 Bolt Court, FLEET STREET, E.C.

GAS-EXHAUSTER Wanted, about 40,000 Cubic Feet per hour.
Address No. 2496, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS and Cannel Coal. Wanted Supplies for Lancashire.
Apply, by letter, to No. 2490, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Supplies of Oil for Gas Making and PETROLEUM and Other SPIRITS for the enriching of Gas.
Apply, by letter, to No. 2431, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

KING'S TREATISE ON COAL GAS.

WANTED to Purchase, a copy of Vol. I. of this work, if in good condition, or a set of the three Volumes would be bought cheap.
Address No. 2489, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an Offer for a quite new Stott's patent GAS-GOVERNOR, for 250 lights. Only been in use Three Months. Satisfactory reasons for discontinuing the use of same.
Apply, by letter, to No. 2483, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE, cheap—One 20,000 cub. feet per hour Beale's EXHAUSTER, with two 8-inch Disc Valves. Also one to pass 5000 Cubic Feet per hour. Both in perfect condition.
Apply to SAMUEL WHILE, 60, Queen Victoria Street, LONDON, E.C.

TENDERS FOR GAS COAL.

THE Gas Committee of Limerick invite TENDERS for the supply of best NEWCASTLE GAS COAL for One or Two Years.
For Particulars, apply to the Manager of the Gas-Works.
Offices: 34 and 35, William Street,
Limerick, March 1, 1895.

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality.
Sample and Price on application.
OXIDE PAINTS, OILS, SULPHURIC ACID, &c.
120 and 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."

OXIDE OF IRON.

FINEST Quality of Natural Bog Ore.
Particulars and price, apply to Mr. T. L. ARCHER 20, Fennel Street, MANCHESTER.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for, Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings, at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.
Telegraphic Address: "PORTER LINCOLN."

JOHN RILEY & SONS, Chemical Manu- facturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

HYDRATED OXIDE OF IRON.

PREPARED from pure Iron.
Two or three times as rich as Bog Ore.
Strong action on Sulphuretted Hydrogen.
To be used alone, but will increase activity of other Oxides.
Less than half the price of Bog Ore.
Can be lent on hire.
Write for tabulated results.
READ HOLLIDAY AND SONS, LIMITED, HUDDERSFIELD.

In Paper Covers, Post Free, Price 2s.

S. CARPENTER on the Purification of COAL GAS from CARBONIC ACID and the SULPHUR COMPOUNDS by LIME, OXIDE OF IRON, and ATMOSPHERIC AIR.
S. & H. W. CARPENTER, 3, Bedford Villas, Carshalton SURREY.

HAMBURG (GERMANY),
ED. ZIETZ, I. BRANDSTWIETE, 20,
COMMISSION BUSINESS,

AGENT for the Deutsche Gasglühlicht Akt. Ges. Berlin, offers his services FOR THE SALE OF LIGHTING AND HEATING APPARATUS of every description; also of any Patent Novelties.
Business connections with all Countries.
Correspondence in all modern Languages.

MARKET HARBOROUGH GAS COMPANY.

THE Directors of the above Company invite TENDERS for supplying and fixing one TOWER SCRUBBER, with Washer in same, also two ANNULAR CONDENSERS.
Further Particulars from the undersigned.
Tenders to be sent in by Friday, March 29.
J. FRYER,
Manager.

THE Urban District Council of Hindley are prepared to receive TENDERS for the supply of FIRE-CLAY, RETORTS, FIRE-BRICKS, &c.
For Particulars apply to Mr. W. Dickinson, Gas and Water Manager.
Sealed tenders to be sent to the undersigned not later than March 16, 1895.
By order,
STEPHEN HOLT,
Clerk.
Offices: Cross Street, Hindley,
Feb. 28, 1895.

TENDERS FOR TAR.

THE Directors of the Exeter Gaslight and Coke Company invite TENDERS for their surplus TAR for One Year from Lady-day next.
Delivery on Company's Works filled into Purchaser's Tanks.
Sealed tenders, endorsed "Tender for Tar," will be received by the undersigned on or before Tuesday, the 12th of March next; but the Directors do not bind themselves to accept the highest or any tender.
By order,
W. A. PADFIELD,
Engineer and Secretary.
Gas Offices: 248, High Street,
Exeter, Feb. 16, 1895.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of LIME required in the Purification of Gas at their respective Works, during the Twelve Months ending March 31, 1896.
Quantity required, about 1000 tons.
Forms of Tender, &c., may be obtained on application to the Gas Engineer, Gas Offices, Bloom Street, Salford.
Sealed tenders, endorsed "Lime," addressed to the Chairman of the Gas Committee, must be delivered to me not later than Three p.m. on the 7th of March next.
By order,
SAMUEL BROWN,
Town Clerk.
Town Hall, Salford,
Feb. 25, 1895.

BOROUGH OF BRIGHOUSE.

THE Mayor, Aldermen, and Burgesses of the Borough of Brighouse, acting by the Council, are prepared to receive TENDERS for the supply of the following Stores—viz., FIRE-CLAY GOODS, IRONMONGERY, BRASS MAIN-COCKS, NEW WET GAS-METERS, NEW DRY GAS-METERS, OIL, PAINTS, &c., STEEL GOODS, WROUGHT-IRON TUBES AND FITTINGS, WROUGHT-IRON GOODS, and BRUSHES—required by the Gas Committee during the Year ending March 25, 1896.

Specification and Form of Tender can be obtained on application at the Gas Engineer's Office, Public Offices, Brighouse.

Sealed tenders are to be sent in on or before Saturday, March 9, 1895, addressed to the Town Clerk, Public Offices, Brighouse.

The lowest or any tender not necessarily accepted.

By order,
JAMES PARKINSON,
Town Clerk.

Public Offices, Brighouse,
Feb. 28, 1895.

MANCHESTER CORPORATION GAS-WORKS.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the purchase and removal of the GAS TAR to be produced at their several Stations during a period of One, Two, or Three Years, commencing as follows, viz.—

Bradford Road Station, from Noon on the 31st of March, 1895.
Rochdale Road Station, from Noon on the 24th of June, 1895.
Gaythorn Station, from Noon on the 1st of August, 1895.

The Committee do not bind themselves to accept the highest or any tender, and reserve the right to divide the tenders as they may consider advisable.

Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Tar," must be delivered at the Offices of the Gas Department, Town Hall, on or before Thursday, the 21st of March next.

Forms of Tender and other Particulars may be obtained on application in writing to Mr. Charles Nickson, Superintendent of the Department.

By order of the Gas Committee,
WM. HENRY TALBOT,
Town Clerk.

Town Hall, Manchester,
Feb. 15, 1895.

TO GAS ENGINEERS, CONTRACTORS, AND BOILER MAKERS.

ABERGAVENNY GAS-WORKS EXTENSIONS.

THE Urban District Council of Aber-gavenny invite TENDERS for the construction of the following WORKS at the Abergavenny Gas-Works:—

TENDER No. 1.—TELESCOPIC GASHOLDER, 65 ft. by 22 ft., and STEEL TANK.
TENDER No. 2.—STATION GOVERNOR, VALVES, and CONNECTIONS.
TENDER No. 3.—EXHAUSTER and STEAM-ENGINE combined.
TENDER No. 4.—Two CORNISH STEAM-BOILERS.

Plans and Specifications of the several Works required may be seen, and Forms of Tender obtained, on application to Mr. S. Cross, Engineer, Gas-Works, Abergavenny.

Separate sealed tenders, endorsed "Gasholder and Tank," "Station Governor, &c.," "Exhauster and Steam-Engine," or "Cornish Boilers," as the case may be, to be sent to the undersigned, Town Hall, Abergavenny, not later than Friday, March 15, 1895.

The lowest or any tender not necessarily accepted.

The Contractors whose tenders are accepted to enter into written contracts, with approved sureties, for due performance.

J. T. RUTHERFORD,
Clerk to the said Urban District Council.

Town Hall, Abergavenny,
Feb. 22, 1895.

NOTICE.

TO GAS ENGINEERS AND OTHERS.

MESSRS. CLAPHAM BROS., Limited, Keighley, Yorkshire, are no longer authorized to Manufacture my CONDENSER and WASHER-SCRUBBERS.

The above-named Gas Apparatus are erected and giving entire satisfaction at the following places: Neath, Lincoln, Sheffield, Ellesmere, Mountain Ash, Malden, Cullingworth, Montreal (Canada), Woodstock (South Africa), Cape Town (South Africa), &c.

These Appliances can now be obtained solely of the undersigned.

Winchester House, London, E.C. J. A. KELMAN.

NOTICE.

TO GAS ENGINEERS AND OTHERS.

CLAPHAM BROS., LIMITED, of Keighley, Yorks., beg to intimate that they are the SOLE MAKERS of LAYCOCK & CLAPHAM'S "ECLIPSE" WASHER-SCRUBBER, and that no person or persons beyond the Patentees and Makers have ever had any interest whatever in the Patent.

They are also the SOLE MAKERS of CLAPHAM'S PATENT IMPROVED "ECLIPSE" CONDENSER, as supplied to Bradford, Manchester, and other Gas-Works.

Orders and Inquiries promptly attended to. See Advertisement in this week's JOURNAL, p. 516.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

(INCORPORATED BY ACT OF PARLIAMENT.)

SALE OF STOCK.

MR. ALFRED RICHARDS is instructed by the Directors of the Tottenham and Edmonton Gaslight and Coke Company to SELL BY AUCTION, at the Mart, Tokenhouse Yard, in the City of London, on Tuesday, March 12 next, at Two o'clock in the afternoon precisely, £20,000 (being third portion) of "C" STOCK, in the following lots: 150 of £100, and 100 of £50. The sale is made under the Provisions of the Company's Act, 1882.

Particulars and Conditions of Sale, with a copy of Audited Accounts for 1894, may be had at the Company's Offices, Willoughby Lane, Tottenham; Messrs. Merriman, Pike, and Merriman, Solicitors, 25, Austin Friars, London; Messrs. H. E. Tatham and Co., Stock and Share Brokers, 3, Tokenhouse Buildings, London; or of Mr. Alfred Richards, Auctioneer, 18, Finsbury Circus, London, and 816, High Road, Tottenham.

By order,
JAMES RANDALL,
Secretary.

February, 1895.

HARCOURT'S COLOUR TEST.

For Carbon Bisulphide, Sulphuretted Hydrogen, and Carbonic Acid in Coal Gas.

The Materials for the above Tests may be obtained from

Mr. S. E. MILLER, 115, Cowley Road, Oxford

JAMES OAKES & Co.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

HOLMSIDE GAS COALS.

PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS:—

Yield of Gas Per Ton	11,205 Cubic Feet.
Illuminating Power, 16 7/10 Stand. Sperm. Candl.	
Coke (of good & pure quality)	13¾ Cwt. Per Ton.
Sulphur	A little over 1 Per Cent.
Ash	Under 1 Per Cent.
Tar	163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor	103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE, 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

Yield of Gas Per Ton	10,500 Cubic Feet.
Illuminating Power	17 Stand. Sperm Candl.
Coke (of excellent quality)	13½ Cwt. Per Ton.
Sulphur	1·13 Per Cent.
Ash	1·34 Per Cent.
Tar	180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor	94½ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COAL-FIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,
HOLMSIDE AND SOUTH MOOR OFFICES,
NEWCASTLE-UPON-TYNE.

ALEXANDER CAMERON,
CANNEL & GAS COAL MERCHANT,
48, WEST REGENT STREET,
GLASGOW.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD
BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

LONDONDERRY GAS COALS

FROM THE

MARQUIS OF LONDONDERRY'S COLLIERIES,
COUNTY OF DURHAM.

Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by
Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,
SEAHAM HARBOUR, COUNTY OF DURHAM.

BOLDON GAS COALS.

Worked by THE HARTON COAL CO., LTD.

Output about 3000 tons per day.

ANALYSIS—

Yield of Gas per ton	10,500 Cubic Feet.
Illuminating Power	16·9 Candles.
Coke	66·7 Coke.
Sulphur	0·86 Sulphur.
Ash	2·04 Ash.

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Crystal Palace District Gas Company, Bombay Gas Company, San Paulo Gas Company, Ipswich Gaslight Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

For prices, &c., apply to the

HARTON COAL COMPANY,
LIMITED,
Newcastle-on-Tyne.
W. H. PARKINSON,
FITTER.

THOMAS TURTON AND SONS, LIMITED,

SHEAF WORKS, SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY FOR ENGINEERS.

STEEL OF ALL DESCRIPTIONS

SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.

London Office:

90, CANNON STREET, E.C.

KENT'S THICK GAS COAL

RAISED AT

The Wharncliffe Woodmoor Colliery, BARNSLEY.

Yield of Gas, nearly 12,000 *Cubic Feet per ton of Coal: and Illuminating Power nearly* 17½ *Candles.*

The following is a complete ANALYSIS made by Mr. R. O. PATERSON, C.E., Gas-Works, Cheltenham :—

Specific Gravity (Water 1).	1·276
Weight of One Cubic Foot.	79·700 lbs.

PROXIMATE ANALYSIS.

Moisture in Coal	2·68 per cent.
Volatile Matter.	35·60 ,,
Fixed Carbon	58·80 ,,
Sulphur	0·96 ,,
Ash	1·96 ,,

COMMERCIAL ANALYSIS.

Gas per Ton of Coal	11,760 cub. feet.
Gas per Cubic Foot of Coal	418 ,,
Illuminating Power	17·44 candles.
Value of One Cubic Foot in Sperm	418 grains.
Value per Ton of Coal in Sperm	703 lbs.
Coke per Ton of Coal	1367 ,,
Coke	61·05 per cent.
Ash in Coke	3·21 ,,
Sulphur Eliminated with Volatile Products per Ton of Coal	9·4 lbs.
Sulphur in Coke per Ton of Coal	12 ,,
Ammoniacal Liquor per Ton of Coal	19·7 galls.
Tar per Ton of Coal	12 2 ,,

R. O. PATERSON, C.E.

Gas-Works, Cheltenham, 8th August, 1894.

For Price, &c., apply to THE Wharncliffe Woodmore Colliery Co LIMITED. BARNSLEY.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, 22, Alwyne Road, Canonbury, LONDON, N.

Prices are Reduced.

HEATHCOTE GAS COAL.

Rich in Illuminating Power & Yield of Gas.

Above the average in Weight & Quality of Coke.

Maintains a High Standard in Residuals.

THE GRASSMOOR Co., Ld., CHESTERFIELD.

PIPES, 2-in. to 8-in. **PIPES,** 2-in. to 8-in. **PIPES.**

MONIER-WILLIAMS & Co.

IRONFOUNDERS,

MIDDLESBROUGH.

THE DRUM

FOR PUMPING AIR, WATER, SEMI-FLUIDS, &c.

See Advertisement in last and next issue.

T. B. KITTEL, SHEFFIELD.

CONTRACTS FOR SUPPLIES OF ANY OF THE PRINCIPAL

ENGLISH & SCOTCH CANNELS.

REAL SILKSTONE GAS COAL

ANALYSIS AND PRICES ON APPLICATION.

T. B. KITTEL, SHEFFIELD.

TROTTER, HAINES, & CORBETT,

Brettell's Estate

FIRE-CLAY & BRICK WORKS, STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Proprietors of

BEST GLASSHOUSE POT & CRUCIBLE CLAY.

SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

ROBERT MARSHALL, CANNEL COAL MERCHANT,

97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on Application.

THORNLEY GAS COALS

WORKED BY THE

WEARDALE IRON AND COAL COMPANY, Ld.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

The Analysis made by Messrs. J. and H. T. Pattinson, Public Analysts for Northumberland, gives 10,500 cubic feet of Gas per ton, with an Illuminating Power of 16·3 Candles and 67·3 per cent. of Coke. The following is a Working Analysis made of these Coals by the Tudhoe and Sunderland Bridge Gas Company:—

[COPY.]

TUDHOE AND SUNDERLAND BRIDGE GAS COMPANY.

Tudhoe Gas-Works, Spennymoor, 8th June, 1893.

Messrs. The

WEARDALE IRON & COAL COMPANY, LTD.

GENTLEMEN,

For the last two months we have used your **THORNLEY GAS COAL** exclusively at these gas-works; and I have pleasure in herewith giving you the actual results obtained during the trial.

Yield of Gas per ton: 10,300 cubic feet.

Yield of Coke: 13½ cwt.

Illuminating Power of Gas, average of a series of tests, **17 Sperm Candles.**

The Coke was of excellent quality.

The following is a complete ultimate Analysis of the Coal.

	PER CENT.
Carbon	83·128
Hydrogen	5·116
Oxygen	7·401
Nitrogen	0·585
Sulphur	0·620
Ash	3·130
Water	0·020
	100·000

Analysis of the Coke.

Carbon	93·31
Sulphur	0·61
Ash	5·00
Moisture	1·08
	100·00

I am, Gentlemen,
Yours truly,
A. B. COWAN,
Manager.

For Price, &c., apply to the WEARDALE IRON & COAL Co., Ld.

QUAYSIDE, NEWCASTLE-ON-TYNE.

Cloth Bound, Price 3s. 6d., Post Free.

THE ROYAL COMMISSION ON THE METROPOLITAN WATER SUPPLY

—1892-3.—

Report of the Evidence (reprinted from the JOURNAL), with comments on the Inquiry, and the Commissioners' Conclusions and Recommendations.

London: WALTER KING, 11, Bolt Court, Fleet St., E.C.

BOWENS' Ltd. Successors, STOURBRIDGE.

MANUFACTURERS OF

BEST FIRE-BRICKS; INCLINED, HORIZONTAL, and SECTIONAL RETORTS; LUMPS, TILES, &c., of every description.

Established 1860.

INCANDESCENT GAS-LAMPS

Welsbach Patents.

Great Reduction in Prices

Due to Colossal Sales.

Now supplied at 10/6 Complete.

Important Notice.

Owing to the **unexpectedly large sales** of the Incandescent Gas-Light Burners, the Company are now in a position to offer these to the public at a **considerably Reduced Price;** thus bringing the unquestionable advantages of this System within the reach of the most moderate incomes.

At the higher price, we claimed with justice that the initial cost of the burner was covered by the saving in gas in twelve months, or less. We can, with equal justice, claim that at the **Reduced Price** this saving is effected in **eight months, or less.**

THREE PATTERNS OF INCANDESCENT GAS-LIGHT BURNERS ARE NOW SUPPLIED.

The Ordinary "C" Burner	**Price 10s. 6d.**
The "C" Bye-Pass Burner	**„ 12s. 6d.**
The "S" Bye-Pass Burner	**„ 12s. 6d.**

Mantles will be supplied as heretofore at the reduced rate of 1s. 3d. for use with the Burner supplied by the Company.

PUBLIC WARNING.

The Mantles manufactured by the Incandescent Gas-Light Company can only (as provided by the terms of the limited licence granted with each Mantle) be lawfully used on Burners of the Company's own manufacture. Any person who sells one of the Company's Mantles with, or for use on, any other Burner, and any one of the public who uses one of the Company's Mantles on any Burner not of the Company's manufacture, will render himself liable to proceedings for **Infringement of the Company's Patents.** All persons are therefore warned against having anything to do with Burners not bearing the name of the Incandescent Gas-Light Company stamped upon them.

The *Lancet* pronounces the Incandescent Gas-Light to be the HEALTHIEST, BEST, AND MOST ECONOMICAL SYSTEM OF GAS LIGHTING.

COPY OF FULL REPORT SENT GRATIS ON APPLICATION.

For further Particulars, apply to—

The INCANDESCENT GAS-LIGHT CO.

LIMITED,

PALMER STREET, WESTMINSTER, LONDON, S.W.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.

For prices, f.o.b. Ship or Delivered by Rail, apply to
THE WALLSEND & HEBBURN COAL COMPANY, LTD.,
8 Lombard Street, NEWCASTLE-ON-TYNE.
W. RICHARDSON, Fitter.

ARMSTRONG'S PATENT
CANDLE SAFETY LAMPS.

No. 1. No. 2. No. 3.
48, MANCHESTER STREET, GRAY'S INN ROAD, W.C.

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO.,
Central Plumbing Works, Town Hall Square, BOLTON.
Practical Makers of all kinds of Saturators, and Specialists in every description of Lead Work required in connection with Sulphate Plants.
Special attention to Repairs.
Improved Lead-Burning Machines, Sulphate Bagging Machines, Copper Scoops, &c.
HIGHEST REFERENCES ON APPLICATION.

Telegrams, "INCLINED, LONDON."
Little & Graham Ltd.
RETORT HOUSES ERECTED COMPLETE
WORKING RESULTS GUARANTEED
GILBERT LITTLE
MAURICE GRAHAM, A.M.I.C.E.
ENGINEERS CONTRACTORS AND Carbonizing Specialists.
3 & 4. LIME STREET SQ.
LONDON, E.C
RINK AUCT

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for
CANNEL & COAL.

TYNE
BOGHEAD CANNEL.

Yield of Gas per ton . . . . . 13,155 cub. ft.
Illuminating Power . . . . . 38·22 candles.
Coke per ton . . . . . 1.301'88 lbs.

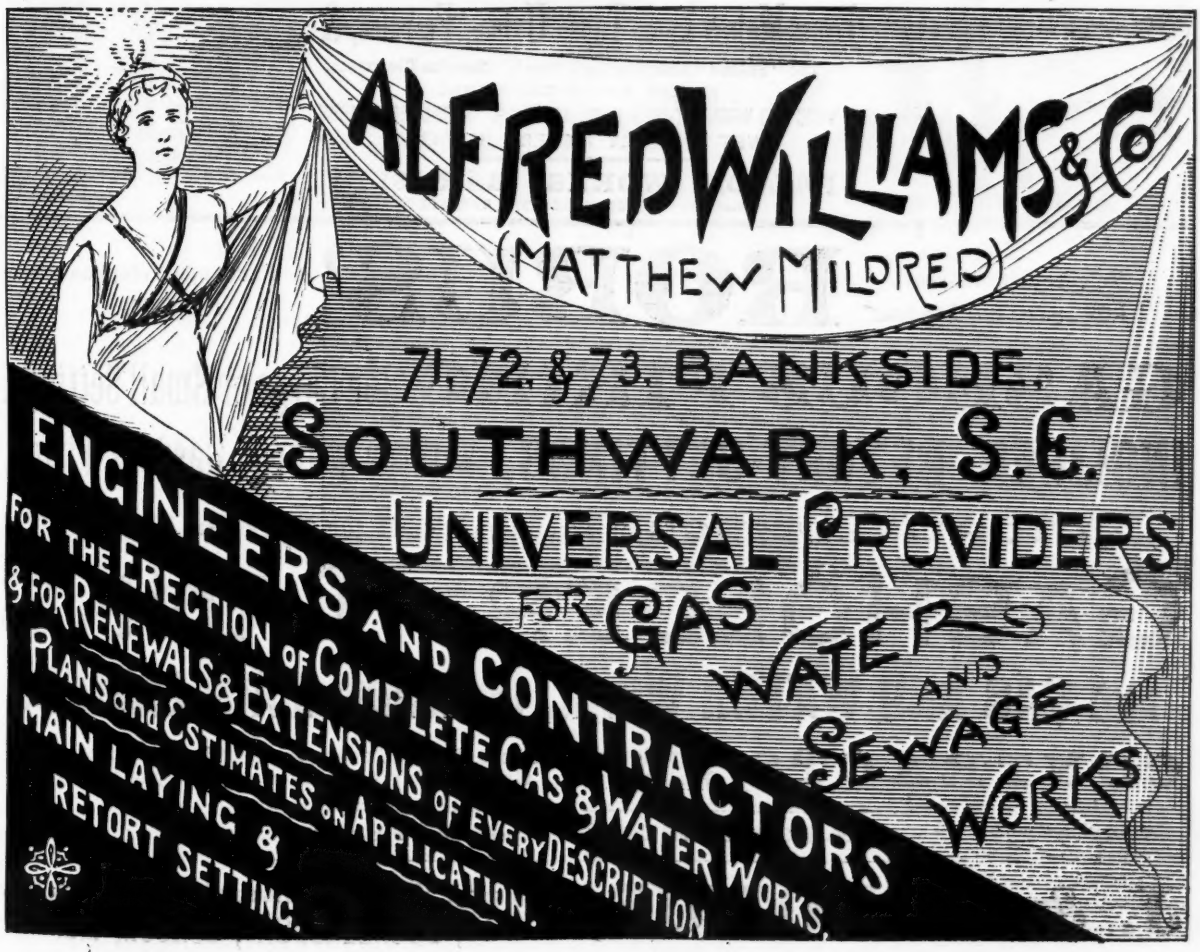
EAST PONTOP GAS COAL.

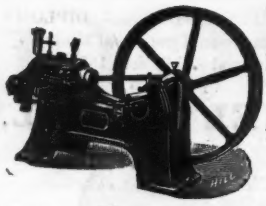
Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16'3 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16'3 candles.
Coke . . . . . 73'1 per cent.

For Prices and complete Analysis, apply to
THOS. W. DANCE & SONS,
COAL OWNERS, NEWCASTLE-ON-TYNE;
OR
E. FOSTER & CO.,
21, JOHN STREET, ADELPHI, LONDON, W.C.


ALFRED WILLIAMS & Co
(MATTHEW MILDRED)
71, 72, & 73, BANKSIDE,
SOUTHWARK, S.E.
UNIVERSAL PROVIDERS
FOR GAS WATER AND SEWAGE WORKS
ENGINEERS AND CONTRACTORS
FOR THE ERECTION OF COMPLETE GAS & WATER WORKS,
& FOR RENEWALS & EXTENSIONS OF EVERY DESCRIPTION
PLANS and ESTIMATES on APPLICATION.
MAIN LAYING &
RETORT SETTING.



DON'T BE PREJUDICED

Because the prices of Monarch Gas-Engines are so low, but if you are wanting, have one on trial, and prove conclusively that they are the best value on the market.

1½-B.H. Power, with Governors, &c., only £28 10s., less liberal terms. Other sizes to 12-H.P. in proportion. Catalogue of Telephones, Bell Speaking-Tubes, Electric Bells, &c., 4d.

W. H. BAUGHAN & CO., CHARLBURY.

THE SILICA FIRE-BRICK COMPANY,

OUGHTYBRIDGE, NEAR SHEFFIELD.

Established 1858. The First Manufactory of Silica and Dinas Fire-Bricks erected in England.

MANUFACTURERS OF

SILICA FIRE-BRICKS

(TRADE MARK "SILICA")

Specially adapted for Siemens-Martin Gas-Furnaces; also for Gas, Copper, Iron, Steel, and other Furnaces where intense heat is required.

BESSEMER GANNISTER, STEEL-FURNACE GANNISTER, COPPER-FURNACE GANNISTER, IRONFOUNDERS' CUPOLA SAND, FINE-SETTING SILICA CEMENT, STEEL MOULDERS' COMPOSITION.

Our Silica Bricks have gained a high reputation for Unsurpassed Quality in most of the leading Firms in England and on the Continent. Export orders delivered Liverpool, Hull, Grimsby, or the Tyne.

HUTCHINSON BROTHERS,

GAS ENGINEERS, &c.,

MANUFACTURERS OF

Improved Wet & Dry Gas-Meters.

STATION-METERS. LAMP-METERS.

Test Gasholders and General Gas Apparatus.

Brass Main & Lamp Taps. Unions, Ferrules, &c.

The "Falcon" Lamplighter's Torch. Service Cleansers.

SYPHON AND OTHER PUMPS.

WOOD AND WROUGHT-IRON PURIFIER-GRIDS. SCRUBBER BOARDS.

WET AND DRY METERS REPAIRED.

FALCON WORKS, BARNSLEY.

Telegrams: "HUTCHINSON BROS., BARNSLEY."

Telegraphic Address: "ROBUSTNESS, London."

ROBUS'

Exchange Telephone No. 1758.

GASEOUS FIRING for Large or Small Settings.

INCLINED RETORT-SETTINGS, with or without Gaseous Firing.

RETORT-SETTINGS of exceptional Merit for Works on Wet Soils.

GASHOLDER TANKS

AND GAS AND WATER WORK, INCLUDING MAIN LAYING.

CONTRACTS Entered into for Retort Work of every kind, and all descriptions of Gas Apparatus. Guarantees given for the efficiency of our Work.

Plans, Specifications, and Estimates, with every Particular.

J. & H. ROBUS, Gas and Water Contracting Engineers, 20, BUCKLERSBURY, LONDON, E.C.

WILLEY & CO.

GAS ENGINEERS & CONTRACTORS,

Central Works: Commercial Road, EXETER;

Meter Works: James Street, EXETER.

Telegraphic Address: "WILLEY, EXETER." Telephone No. 132.

Edison-Bell Phonograph Used.

Metropolitan Agent: CAPTAIN ACLAND, M.Inst.M.E., Assoc.M.Inst.C.E., DOCK HOUSE, BILLITER STREET, LONDON.

Manufacturers of every Requisite for Gas-Works.

Specialities: GASHOLDERS, GAS-METERS, GAS-FITTINGS.

WILLEY AND CO. beg to announce that they have recently acquired the Sole Right and Proprietorship of the

"SIMPSON"

Automatic Penny-in-the-Slot Meter

(By Royal Letters Patent).

An application of the "Vernier Principle," ensuring Mathematical Accuracy of Registration, combining all the latest Scientific Improvements

PRICE INSTANTLY, SIMPLY, & READILY ADJUSTED *IN SITU*, BY SINGLE FEET OR HALF FEET, WITHOUT CHANGE OF WHEELS.

STRENGTH, DURABILITY, & MINIMUM SIZE.

AMPLE WARNING & GRADUAL EXTINCTION.

BASE OR MISTAKEN COIN DETECTED & RETURNED.

Terms on Application.

NEW CATALOGUE OF GAS-FITTINGS of novel and registered designs, with Special Quotations to Gas Companies, now in the Press for early circulation.

Agents for the "MAXIM PATENT CARBURETTOR" New Process of Gas Enrichment by Carburine.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LTD.

CARBURETTED WATER GAS ENGINEERS.

"Merrifield-Westcott-Pearson" Setting

GUARANTEED to give BETTER RESULTS than any other Plant in the Market.

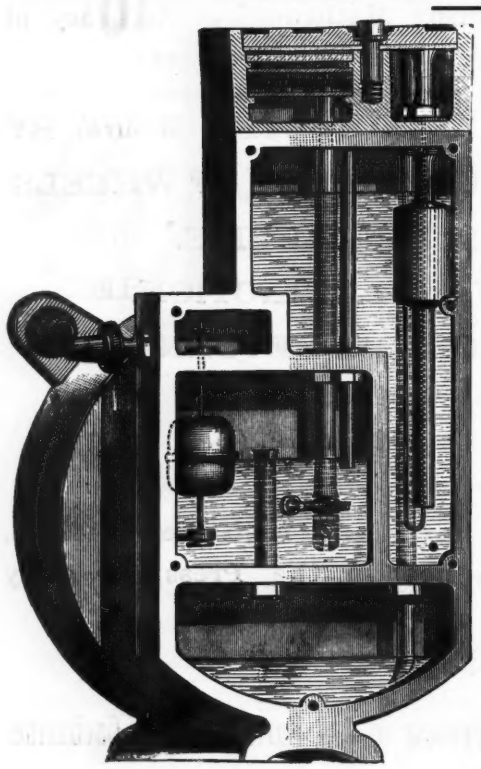
London Offices: SUFFOLK HOUSE, LAURENCE POUNTNEY HILL, E.C.

MOBBERLEY & PERRY
STOURBRIDGE.

Manufacture & supply best quality of
Gas Retorts (SEGMENTAL, HORIZONTAL, or INCLINED.)
Special Bricks & Blocks for GENERATOR & REGENERATOR FURNACES.
FIRE BRICKS, LUMPS, & TILES, BLUE STAFFORDSHIRE VITRIFIED BRICKS FOR PAVING, &c., &c.
EVERY REQUISITE FOR GAS-WORKS. Retort Setters sent to any part of the Kingdom.
Contractors for the erection of Retort-Benches complete.

London Agents:
BALE & HARDY, Gas Engineers and Contractors, BRIDGE HOUSE, 181, QUEEN VICTORIA STREET, E.C.

ALDER AND MACKAY,
MANUFACTURERS OF
IMPROVED WET AND DRY GAS-METERS
IN CAST-IRON AND TIN CASES OF THE HIGHEST EXCELLENCE.



Sole Makers of Green's Patent Underground Wet Gas-Meters for Street Lighting, &c., and Ogden's Patent Spindle Tube for Wet Gas-Meters.

GREEN'S PATENT
UNDERGROUND METER

Has been designed to obviate that which has hitherto prevented the general adoption of underground Meters—namely, their serious cost. No box is required, and the saving thus effected as compared with ordinary underground Meters, where either a box or meter-pillar is necessary, is fully one-half. The price of one for three lights is 28s., and the other sizes are correspondingly cheap. When fixed, the only part of the Meter exposed to view measures 6½ inches by 3½ inches. By the Indicator with which the Meter is fitted, the Inspector can at once discern whether water is required; but as the Meter is of the compensating description, water will probably need only be supplied ONCE A YEAR. It is advisable to fill the Meter with a non-freezing liquid, which does not injure the fittings; and this can be supplied at about 1s. 3d. per gallon.

Prices and all Information on Application.

NEW GRANGE WORKS, EDINBURGH.

HIGHEST AWARDS given for our WET and DRY METERS at
Exhibitions held at GLASGOW, CALCUTTA, and EDINBURGH.

WILLIAM INGHAM & SONS,

Incorporated with the Leeds Fire-Clay Company, Ltd.,

WORTLEY FIRE-CLAY WORKS,

Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT

MACHINE-MADE GAS-RETORTS.

GAS AND WATER PIPES

AND

CASTINGS OF EVERY DESCRIPTION.

MANUFACTURED BY THE

CLAY CROSS COMPANY,

CHESTERFIELD.

TRADE	TELEGRAMS:	LONDON AGENTS:
CXC	"JACKSON"	BECK & Co.,
MARK.	CLAY CROSS.	130, ST. SUFFOLK ST., S.E.

GODDARD, MASSEY, & WARNER'S

IMPROVED

Sulphate of Ammonia Apparatus.

The most successful and approved Apparatus known up to the present time.

FOR REFERENCES, PARTICULARS, TESTIMONIALS, AND PRICES APPLY TO

GODDARD, MASSEY, & WARNER,

ENGINEERS,

NOTTINGHAM.

The Apparatus has been supplied to the following Firms—

BURT BOULTON, & HAYWOOD, SILVERTOWN, and ELING.
CHANCE BROTHERS, OLDBURY (Four Apparatus).
RUNCORN SOAP & ALKALI CO., Limited, RUNCORN.
NETHAM CHEMICAL CO., Limited, BRISTOL.
ANIMAL CHARCOAL CO., Limited SHADWELL.
WM. BUTLER & CO., BRISTOL.
KEMPSON & CO., Pye Bridge.

And to the following Gas Companies and Corporations—

ILKESTON.	BURY.	CHORLEY.
WIDNES.	BRIGHOUSE.	WHITEHAVEN.
HALIFAX.	MARKET HARBRO'.	CHESTER.
ALTRINCHAM.	PRESCOT.	SOUTH SHIELDS
DENTON.	SOWERBY BRIDGE.	LEEK.
ST. ALBANS.	LEICESTER.	IPSWICH.
DUKINFIELD.	DARWEN.	BOURNEMOUTH.
NORTHWICH.	NELSON.	SALFORD.
HUDDERSFIELD.	ORMSKIRK.	LUTON.
		HAMPTON COURT.

THE WIGAN COAL & IRON CO., LIMTD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

MIDLAND DISTRICT OFFICE: 22, TEMPLE ST., BIRMINGHAM—SOLE AGENT: A. C. SCRIVENER.
TELEGRAPHIC ADDRESS: "WIGAN BIRMINGHAM." TELEPHONE No. 200.
LONDON DISTRICT OFFICE: 6, STRAND, LONDON—C. PARKER & SON, SOLE AGENTS.
TELEGRAPHIC ADDRESS: "PARKER LONDON."

JONAS DRAKE & SON

OVENDEN, HALIFAX.

LONDON OFFICE

60, QUEEN VICTORIA ST., E.C.

Telegraphic Addresses:
"DRAKESON, HALIFAX."
"ECLAIRAGE, LONDON."

Telephone: No. 43.
HALIFAX EXCHANGE.

GAS ENGINEERS,

CONTRACTORS, IRONFOUNDERS,

RETORT SETTERS, FURNACE BUILDERS, &c., &c.

GASEOUS FIRING A SPECIALTY.

ALEX. C. HUMPHREYS, M.E. A. G. GLASGOW, M.E.

TELEGRAPHIC ADDRESS:
"EPISTOLARY, LONDON."

HUMPHREYS & GLASGOW,

Contracting Engineers for
CARBURETTED WATER GAS PLANT,
9, Victoria Street, London, S.W.

United States Office:
64, Broadway,
New York.

CLAYTON SON & Co, LTD,

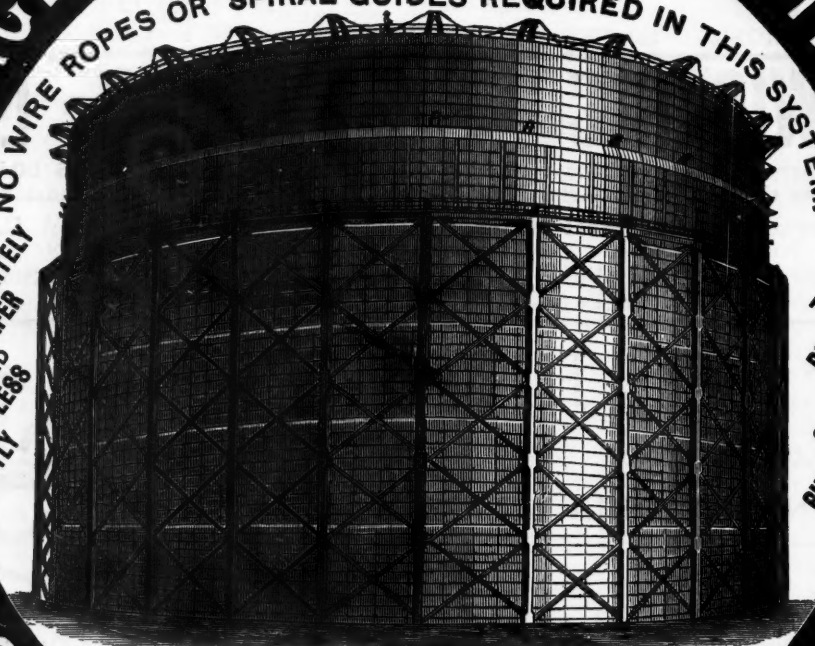
MAKERS OF

WORKS LEEDS

THE LARGEST GASHOLDER IN THE WORLD

GASHOLDERS OUR SPECIALITY

NO WIRE ROPES OR SPIRAL GUIDES REQUIRED IN THIS SYSTEM.



INFINITELY SAFER AND FAR LESS COSTLY THAN ROPES OR SPIRAL GUIDES.

CAPACITY 12 MILLION CUBIC FT.

ERECTED AT EAST GREENWICH FOR THE
South Metropolitan Gas Company
IT HAS SIX LIFTS 30 FT DEEP EACH AND IS 300 FT DIAR

MAKERS OF GAS PLANT OF EVERY DESCRIPTION

ROOFS PURIFIERS &c. ALSO

ADDRESS
LONDON
60, QUEEN
VICTORIA ST.
TELEGRAPHIC
"GAS, LEEDS.

GASHOLDERS OF ANY SIZE

ERECTED & COMPLETED WITHIN 12 MONTHS AND AT THE TIME SPECIFIED

HARPER & MOORES,

STOURBRIDGE.

MANUFACTURERS OF

BEST FIRE-BRICKS, GAS-RETORTS,

LUMPS, TILES, AND ALL ARTICLES IN FIRE-CLAY.

Proprietors of Best Glasshouse Pot, Crucible, and other Stourbridge Clays.

MANUFACTURERS OF GLASSHOUSE POTS AND CRUCIBLES OF EVERY KIND.

ESTABLISHED 1836.

OSLER,

BIRMINGHAM.

MANUFACTURERS OF GASELIERS IN GLASS AND METAL.

ESTABLISHED 1861.

JOHN BROTHERTON, LIMITED,

IMPERIAL TUBE WORKS,

WOLVERHAMPTON,

MAKERS OF

TUBES AND FITTINGS

FOR EVERY PURPOSE.

PLEASE APPLY FOR LISTS. Telegrams: "IMPERIAL, WOLVERHAMPTON."

BEST & LLOYD

MAKERS OF THE **BIRMINGHAM.**

PATENT "SURPRISE" PENDANT,

WITH PATENT SHADE.

The ONLY GAS-PENDANT suitable for Domestic Lighting; a room 18 ft. by 14 ft. being beautifully illuminated with one Incandescent Burner.

Extract from the **JOURNAL OF GAS LIGHTING**, Jan. 8, 1895.

"IN CONJUNCTION WITH

THE INCANDESCENT GAS-LIGHT,

it quite **supersedes** the familiar three-light pendant. We are able to bear witness to the **convenience** of the New Pendant."

STEEL SCOOPS

FOR

RETORT CHARGING.

Scoops supplied with or without handles, and of any dimensions or shape required.

HENRY SYKES, Engineer,

66, BANKSIDE, LONDON, S.E.

WILSON CARTER & PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.

ADDRESS CHIEF OFFICES:

Temple Buildings, 50, New Street, Birmingham.

PETTIGREW'S PATENT

Sulphate of Ammonia Plant

ON THE CONTINUOUS SYSTEM

Is the newest in the Market, and is the outcome of practical experience in Sulphate Making.

Old Systems easily and cheaply converted.

ANY SIZE ERECTED COMPLETE AT HOME OR ABROAD.

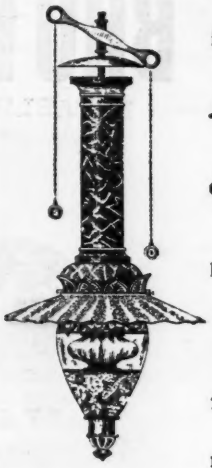
Write for Particulars, Testimonials, and References to

GEO. PETTIGREW & Co.,

GAS AND CHEMICAL ENGINEERS,

MIDDLESBROUGH-ON-TEES.

The Climax of Regenerative Gas Lighting!!



THE

"VERTMARCHE"

A 280-CANDLE POWER

PLAIN IRON LAMP,

CLASS A— 55/-

LIGHT for LIGHT

less than half the price of any other Regenerative Lamp.

Manufactured in England.

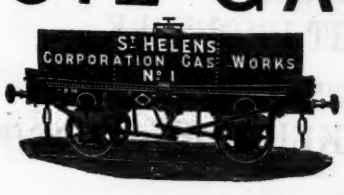
HENRY GREENE & SONS,

153 & 155, CANNON STREET,

LONDON BRIDGE, E.C.

PARTICULARS AND PRICES FREE. AGENTS WANTED.

OIL GAS



BETTER TERMS CAN BE OBTAINED FROM SUPPLIERS OF OIL IF PURCHASERS HAVE THEIR OWN

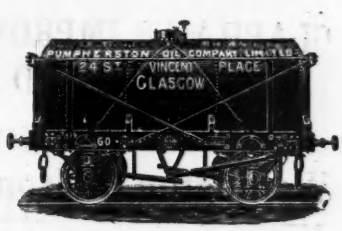
TANK-WAGGONS.

HURST, NELSON, & Co., LTD.,

THE GLASGOW ROLLING STOCK AND PLANT WORKS, MOTHERWELL.

REGISTERED OFFICE:

27, ST. VINCENT PLACE, GLASGOW.



ESTABLISHED 1825.

GAS TUBES

MANUFACTURERS OF EVERY DESCRIPTION OF

IRON OR STEEL LAP-WELDED OR BUTT-WELDED TUBES

FOR ANY PURPOSE.

PHILADELPHIA EXHIBITION, 1876.

ALSO SILVER MEDAL, PARIS.

The Highest Award for Gas-Retorts and other Goods in Fire-Clay has been awarded to KING BROTHERS for their Goods made from their renowned Stourbridge Fire-Clay.

KING BROTHERS,

Proprietors of

STOURBRIDGE CLAYS,

Manufacturers of

Fire-Bricks, Tank Blocks, Glass-House Bricks and Pots, Gas-Retorts, Crucibles in Clay and Plumbago, Gas-Oven Bricks, Bricks for Regenerator Furnaces and Hot-Air Stoves.

STOURBRIDGE, ENGLAND.

CRUCIBLE MANUFACTORY, 46, PENN STREET, CURZON STREET, BIRMINGHAM.

N.B.—Gas, Blast-Furnace, and Glass-House Bricks and Glass-House Pots always in Stock, or made on the Shortest Notice.

CLAPHAM BROTHERS, LIMITED,

ESTABLISHED 1837

LARGE REPEAT ORDERS

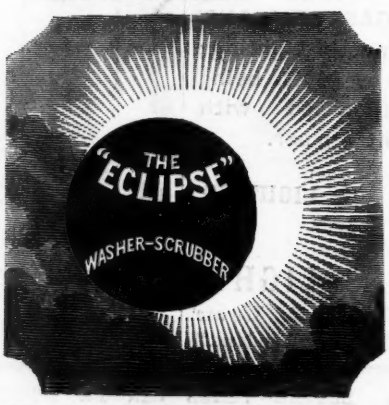
Have been received for

Laycock & Clapham's Patent

"ECLIPSE"

WASHER-SCRUBBERS.

Order Early.



GREAT SUCCESS

OF

Clapham's Patent

"ECLIPSE"

CONDENSER.

SEND FOR PARTICULARS.

CLAPHAM'S IMPROVED VALVES, PURIFIERS, AND RETORT-FITTINGS, MAINS, AND GENERAL CAST AND WROUGHT IRONWORK.

Catalogues, New Book of Testimonials, and full Particulars on Application.

Wellington, Nelson, and Market Street Works, KEIGHLEY, YORKS.

LONDON: Printed by WALTER KING (at the Office of King, Sell, and Railton, Ltd., 12, Gough Square); and published by him at 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, March 5, 1895.